

JMVH

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▪ Abstracts from the 2008 AMMA Conference

The Journal of the Australian Military Medicine Association





18th Annual AMMA Conference

30 October - 1 November 2009



Make a date with the Gold Coast. The 18th Annual AMMA Conference will be held at the Gold Coast Convention and Exhibition Centre, Gold Coast, Queensland from 30 October – 1 November 2009.

Learn about new and exciting advances in military medicine and veterans health and discuss experiences, review concepts and ideas.

The Call for Papers will be distributed in late February 2009. Registrations will open in April.

We look forward to seeing you on the Gold Coast!

Journal of Military and Veterans' Health

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Inside this edition

This edition of the Journal is given over to the publication of the abstracts from a highly successful Association Annual Scientific Conference held in Hobart in October 2008.

Around 70 papers were read from a wide range of international and local speakers ranging across all the health professions.

A full conference report follows the abstracts, highlighting the success and benefits to members and the disciplines of health and medicine in the military and veterans' contexts.

Journal of Military and Veterans' Health

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STATEMENT OF OBJECTIVES

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

- Promoting the study of military medicine
- Bringing together those with an interest in military medicine
- Disseminating knowledge of military medicine
- Publishing and distributing a journal in military medicine
- Promoting research in military medicine

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

President's message

This edition of *JMVH* is devoted to the publication of the abstracts from the highly successful 17th conference of the Association held in October 2008 in Hobart. Included are the conference report and the address presented by the Surgeon General, Major-General Paul Alexander RAAMC, outlining the recent changes to the Defence Health Services and the priorities for the future. For those who attended the conference, I hope that this offering will refresh the memory of an outstanding event; for those who could not attend I am sure that it will serve as a valuable addition to their lexicon of knowledge. *JMVH* is working to publish the best of the papers presented at the conference in the coming months.

Changes at the top

Over recent months there have been some changes to the Association leadership.

First and foremost, with his retirement from active service, AMMA says farewell to Rear Admiral Graeme Shirtley as its Patron. Graeme has had a long and distinguished career both in his civilian professional life as a Radiologist, which he has managed to mix with active involvement in the Reserve Forces. During his time as Patron of AMMA, Graeme has been a solid supporter of the Association, its aims and objectives. Along with Council and members, I thank him for his involvement with AMMA and wish him all the best for the future.

Major-General Paul Alexander has agreed to take up the position of Patron of AMMA in accordance with the Association's constitution. Paul joined the Army in 1976 and transferred to the Reserves in 1998 after pursuing a significant clinical and leadership career. As a Reservist he held leadership positions in the Army Health Reserves as well as being active in General Practice in clinical, policy and management roles. Returning now to the Permanent Forces and being appointed Surgeon General Australian Defence Force, Paul has driven some significant changes to the structure of the Defence Health Services that are outlined in his paper. These, associated with the drive of the new Government to achieve savings in Defence (witnessed by recent reporting of a Defence-wide independent audit), presage some interesting and exciting times. I look forward to working with Paul to continue to advance the Association and

its efforts to promote research and knowledge expansion in military medicine and veterans' health.

I would also like to congratulate Major-General Jeff Rosenfeld RAAMC on his appointment as Surgeon-General Defence Health Reserves. The Reserves are not only fundamental to the operation of the Defence Health Services but are a significant and vital component of the membership of AMMA. They also provide, for both Defence and the Association, a means to cross-pollinate knowledge and skills between the military and civilian health sectors. History has shown that many of the great advances of medicine are made within the military during war, and on many occasions these lessons are forgotten. The Association and its links to both the active military, the reserves and the civilian professions can play a key role in ensuring that this does not occur in the future. Jeff's position as head of the Defence Health Reserves is vital in nurturing this, and I am sure that much collaboration between us will occur in the future.

Within the Association's management structure, Scott Kitchener decided not to stand for re-election to Council and I would like to acknowledge and thank him for his contribution and work for the Association in the role of a Council member and also on the Editorial Board of the Journal. Scott has taken up the position of Managing Editor of *JMVH* and will drive its day-to-day management and publication.

I welcome Neil Westphalen to the Association Council. Neil has served in the Navy for many years and has wide ranging clinical, management and occupational medicine experience. He has taken up the position of Treasurer and I am sure will guide Council in directions that ensure the financial health of the Association.

World events

As we move into a new year, significant world events are evolving that are likely to impact on our professional lives now and into the future.

The United States moves into a new era with the inauguration of Barack Obama as President. Through his campaign and into his transition as President-elect, Obama has signalled new directions in many aspects of US policy and in particular has indicated that US foreign policy

will be more focussed on dialogue and developing multi-lateral solutions to the world's problems than in recent years. He has also committed to withdrawing troops from Iraq and focussing more military effort in Afghanistan. Both directly and indirectly and in the short and long term there will be impacts on the ADF and the Defence Health Services' consequent role in supporting operations, and how these unfold will keep us interested and engaged over the following months and years.

Secondly, and sadly, the escalation of violence in Gaza demonstrates that the need to be prepared to provide health support to combat or humanitarian operations has not diminished.

Further, with the alleged use of a new form of munitions – Dense Inert Metal Explosives (DIME) – we are faced yet again with another dimension for combat casualty care. Leaving aside the immediate impact of injury, perhaps the major cause of concern with these weapons is the reported long-term risks relating to the use of heavy metal tungsten alloys in micro-shrapnel (powder) form. There is some theoretical and laboratory evidence that significant carcinogenic effects may occur from the local impregnation of tissues with the powder (which is almost impossible to remove), particularly in inducing the development of rhabdomyosarcomas. DIME weapons are favoured because they have a much smaller range of explosive effect than more conventional munitions thus limiting “collateral” damage.

Leaving aside the moral issues associated with the reported “horrific” injuries associated with these weapons, their development highlights yet again that many modern weapon and military technologies may have long-term impacts that are not initially apparent and go beyond an individual's immediate involvement in combat and potentially beyond their military service.

Conference 2009

This year's conference will be held on the Gold Coast from the 30 October to the 1 November. We are planning to team up with Controversies in Civilian and Military Trauma to provide not only the usual high quality AMMA conference offerings but to have a separate but integrated theme of trauma care. I look forward to seeing you there.

I trust that you all had a safe and enjoyable festive season, and wish you the best for the coming year.

Russ Schedlich
AMMA President

2008 Conference Report

17th Annual Conference –
Hobart, Tasmania 17-19 October 2008

The Australian Military Medicine Association annual scientific conference was held in Hobart, Tasmania, from 17th to 19th of October 2008.

The Association's third enterprise in Tasmania attracted over 300 delegates, generously supported by over 32 sponsors. Led by two keynote speakers from the United States, over 70 high-quality papers were read, enthralling and stimulating those who attended.

The conference was opened by the Honourable Warren Snowdon MP, Minister for Defence, Science and Personnel, who spoke of the priorities of his government in supporting both the military and veterans in the health challenges that face them. Key issues about which he spoke were the priority to be given to mental health issues, and revised arrangements for the provision of health care to the dependents of those service personnel living in remote localities.

Minister Snowdon was followed by the new Surgeon General Australian Defence Force Major-General Paul Alexander. Paul provided an outline of some of the recent changes to the higher Defence organisation and the rationale for these. He also noted the need for further reorganisation and outlined a process that would be followed to achieve this. He touched on the priorities for health care delivery to the ADF over the next few years.

The first keynote presentation was given by Colonel Rolland "Randy" Reynolds USAF who, in a fascinating paper entitled "From the ground up – setting up a post-Reconstruction era medical service for the Iraqi Air Force", gave an outline of the challenges that he faced when given the task. Most interestingly, the key outcome was the training of a cadre of Iraqi Air Force medical officers in aviation medicine, giving them the knowledge and skills to further drive the development of the capability. A great example of the dictum that to provide sustainable benefits one must empower local people in developing their own solutions.

The second session, which provided concurrent breakouts in Health, Safety and Human Factors, and Workforce, provided for one group a variety of stimulating and challenging ideas and concepts for addressing one of the key challenges of any health service in Australia, the development and sustainment of a professional workforce. Aspects relating to health care support and preventative health were also covered in the other group.

In the afternoon the second plenary session was held. This was led by Colonel Andy Williams who brought a team of Special Forces health professionals to talk about the provision of first-line health support in combat situations. The concepts and principles behind Tactical Combat Casualty Care were presented, and the group provided a fascinating outline of some of the approaches to combat casualty care in this challenging operational environment.

The first day finished with three concurrent sessions covering Deployment Health Surveillance, Capability and a grouping of miscellaneous clinical papers.

The first social event of the conference was the welcome reception which was well attended and offered delegates the opportunity to sample some delightful Tasmanian food and beverages whilst mingling with their colleagues.

The second day commenced with another keynote address by Dr Tyler Smith from the United States Millennium Cohort Study, who led a team of three other presenters providing insights into a programme of health status study that offers the potential for huge benefits to military and veterans' health communities into the future. While the concept of "cost saving initiatives" is unlikely to meet the approval of some ethical experts, the challenges and outcomes achieved by this group were of great interest.

The second session of this day provided three concurrent groupings covering the areas of Training, Health Practice and Governance, and an RAAF Health Update.

After lunch, a plenary session on ethics, which started with two presentations to set the scene followed by a panel discussion, set out some of the challenges and dilemmas that face researchers in general, and in particular those in the military. The stimulating input from the three non-health panel members was particularly refreshing.

The final session of the afternoon, which covered concurrent sessions of Transitions, Training and miscellaneous clinical papers, led into the AMMA Annual General Meeting at the end of the day.

On Saturday evening, conference delegates repaired to the Henry Jones Art Hotel at Constitution Dock for a delightful night of food, conviviality and entertainment. Starting with a cruise along the Derwent River in the pleasantly mild evening weather, delegates sat down to another superb selection of Tasmanian fare.

The Vice Chief of the Defence Force Lieutenant General David Hurley said a few words on the challenges and opportunities that face the health services and how their new position within the VCDF Group could enhance the ability to achieve significant change.

During the course of the evening, three of the waiters burst into operatic renditions which were both entertainingly amusing and of a high standard of musical expression. The entire evening was a splendid opportunity for delegates to network and catch up on each other's progress and adventures.

The third day started, refreshingly late, with two concurrent sessions on Crisis and Capability and Mental Health. The final plenary session covered the ever-present challenge of mental health and deployment, and was led up by six short papers followed by an open forum discussion.

And so in the middle of the Sunday, the general conference ended and delegates proceeded on their way, quite a number taking the opportunity to spend a few extra days in the island state.

Some stayed for an airway management workshop led by Doctors Ben Berg and Dale Vincent from Hawaii, which covered both theory and practical exercises concluding at the end of the day.

The Weary Dunlop Award was won by Dr Adrian Smith for his presentation entitled "Hypoxia below 10,000 feet – an underappreciated risk for helicopter air crew".

Once again this conference proved to be a huge success with a large number of high-quality papers presented in an environment that supported the open exchange of views and the development and re-engagement of professional connections among the delegates.

As always, the Association is grateful to its sponsors, listed below, for their generous support which allows registration fees to be kept down to a reasonable level.

Next year's conference will be held at the Gold Coast Conference and Exhibition Centre from the 30th of October to the 1st of November 2009, and no doubt will be every bit as good as the 2008 conference.

Russ Schedlich
President, AMMA

Review of the Australian Defence Force Health Services

MAJGEN Paul Alexander, Commander Joint Health, Australian Defence Force

As a result of a number of decisions taken by the Chiefs of Service Committee (COSC) in July 2008 the ADF Health Services are undergoing a period of most significant change. Before assuming the appointment of Head Defence Health Services at the beginning of July 2008, Head Defence Health Services (designate) was tasked by the Chief of the Defence Force, the Vice Chief and Deputy Secretary Defence Support to look at the Defence Health Services (DHS) system and look at ways of addressing some of the issues with which the DHS were faced. There are issues with retaining the uniformed workforce, and the way the DHS deliver garrison health support has been seen by some to be less than optimal.

The culmination of the review was the presentation to the COSC of ten initial recommendations which have all been endorsed and essentially set the agenda for the newly established Joint Health Command for the coming years. The recommendations are:

Recommendation 1

COSC agreed to the appointment of Commander Joint Health (CJHLTH), who would be responsible for the delivery of garrison health-care in addition to exercising technical control as SGADF of all ADF health services. CDF redesignated Head Defence Health Services as CJHLTH with effect from 4 August 2008.

Defence Health Services command and control arrangements have been the subject of several reviews and studies in the past 12 years; the most notable being the 1997 ANAO Audit and 2001 Follow-up Audit, and the 2004 Stevens' Review.

The 2004 Stevens' Review noted that *'there is no one authority for the delivery of health services'*, and concluded that shared responsibility with the single Services should remain. The Review noted, however, that shared responsibility creates a requirement for coordination and diffuses the leadership of the health services. Further, it concluded that the role and responsibilities of the Defence Health Services *'is not consonant with current command and control arrangements.'* In summary, technical control alone, and as currently delegated, is insufficient for

the effective management of a complex health-care system in the absence of the command competence, authority, and responsibility with which to exercise that control.

The ANAO reports found that *'health service administrative structures were complex and fragmented and led to inefficiencies and inequities in the allocation of health services, and that a more effective management of health services could be achieved if these structures were rationalised and placed under centralised command and control.'* Recommendation Six in the Follow-up Report noted that *'determined efforts need to be made to address command and control issues associated with the Joint Health Support Agency's effective operation.'* These issues still remain as JHSA exercises technical control of nine area health services, but only has command authority for Robertson Barracks Medical Centre, Lavarack Barracks Medical Centre, and Canberra Area Medical Unit.

When the ANAO reports and the Stevens' Review, along with the early findings of the current review, are brought together it is evident that current command and control for health-care delivery in the garrison is problematic. Unity of command and a single point of responsibility are absent, resulting in:

- Multiple convoluted command relationships, and associated responsibility for elements of the health system;
- a lack of clear ownership of organisations, infrastructure and personnel;
- a culture of cost shifting; and
- ambiguous accountability and responsibility.

Whilst Head Defence Health Services has always had technical control, technical control alone is insufficient. The solution is to appoint an authority who is responsible and accountable for the delivery aspects of garrison health support. The title Commander Joint Health (CJHLTH) sends a clear message. This aligns with Recommendation Six of the original ANAO audit *'that the Surgeon General be given responsibility for the command and control of all ADF health resources, that appropriate human*

and financial resourcing be transferred to the Office of the Surgeon General and that formal agreements be developed with operational commanders in relation to the provision of resources for operational purposes.' This was agreed by Defence but never fully implemented.

Recommendation 2

CDF invited SEC to transfer DHSD and its associated resources to VCDF Group.

That was achieved on 12 September 2008.

In the past 10 years the health services have belonged either to the Defence Personnel Executive or Defence Support Group. The Stevens' Review concluded that the location of the health services in VCDF Group 'would have merit in reinforcing the importance of health issues and in reflecting that health preparation of forces for deployment and provision of health care during deployment are operational matters.' At the time Defence did not support this recommendation. This was in part because VCDF had responsibility for operations, but did not have joint capability responsibilities. VCDF now has joint capability responsibilities and health is clearly a joint capability.

The establishment of CJHLTH and the transfer of DHSD to VCDF Group reinforce the importance of garrison health preparation as an essential component of generating force capability.

Recommendation 3

COSC agree to the creation and appointment of an additional one-star officer in DHSD, bringing the total liability for O7 to three.

Each of the Services has their own requirement for health-care, and the Service Chiefs require technical health advice. The current health services establishment does not guarantee senior health representation from each of the single Services in support of the CJHLTH of the day. A third O7 officer within Joint Health Command is required to ensure balanced representation of each of the Services in the organisation.

Each O7 will have health advice responsibilities to their Service Chief in addition to their responsibilities to CJHLTH. They will also have the authority to represent single Service health requirements on behalf of their Service Chief via their single Service directorates. These officers will provide the coordination conduit for garrison support requirements between CJHLTH and the Service Chiefs, as well as strategic level technical health advice relating to the Service Chiefs' raise, train, and sustain functions.

Recommendation 4

CDF directed CJHLTH to develop Service Level Agreements with CN, CA, and CAF, including supporting DFR 4 instruments, for the delivery of garrison health support. These agreements are to be in place by 31 Mar 09.

Work has already started on those agreements.

Both the 2004 Stevens' Review and the 2001 ANAO Follow-Up Audit found there are discrepancies between the health services that the JHSA:

- is required to provide,
- is expected to provide,
- is resourced to provide, and
- can actually deliver.

Defence's provision of garrison health-care is inconsistent across service delivery locations due to numerous factors, including the location of facilities and availability of the uniformed and contracted workforce. At some locations there is a high level of satisfaction with the status quo. In many locations there is not.

The divide between expectations and requirements can be resolved through the use of Service Level Agreements (SLAs). SLAs will specify the higher level requirements for the delivery of garrison health services, including the uniformed staffing of the health services, the Joint Health Support Agency, and the Area Health Services. SLAs will need to be supported with DFR 4 instruments.

Recommendation 5

COSC agreed that CJHLTH will direct the development of Regional Level Agreements, including supporting DFR 4 instruments. These agreements are to be developed progressively, but are to be in place not later than 01 Jan 10.

Uniformed health-care personnel provide greater workforce flexibility, and potentially are more cost effective, but they are difficult to recruit and retain. Defence has moved increasingly to a contracting model in order to resolve workforce shortages and to achieve garrison efficiencies. The geographic distribution of health-care providers in the civilian sector is heavily skewed to major cities. This means that, in areas like Darwin and Townsville, Defence is competing in the open market for a very scarce resource that already has significant civilian workloads. The contracting solution is expensive and will continue to require close monitoring as health-care costs invariably increase ahead of the CPI.

The appointment of regional health commanders, directly accountable to CJHLTH, will remove current ambiguity and provide local Commanders with a single point of contact for all garrison health support concerns. Regional health commanders will be required to hold the appropriate health administration qualifications, financial delegations and authority, and will be responsible for all aspects of health-care in their region, including contracting arrangements and care delivery standards.

Each regional health commander will be required to develop tailored Regional Level Agreements (RLAs) in consultation with single Service health directorates and local Commanders, noting that joint solutions will be required in most regions. RLAs provide the mechanism to remove ambiguity on what exactly will and will not be provided, and will specify the mutual requirements of all parties for the delivery of health-care, taking into account:

- local Commander requirements and single Service requirements, including advice on military health administration matters;

- operational and training requirements of the supported units in each location;

- the requirement for uniformed health personnel to access continuing professional development opportunities, through garrison health facilities, local health services, and strategic alliances with civilian centres of excellence;

- the availability of deployable health staff to provide health-care to their parent units, as well as collective garrison health requirements;

- regional variations in the availability of the contracted health-workforce; and

- facilities availability.

Recommendation 6

COSC agreed to centralise unit-level health support within hub facilities for the provision of garrison health support. Exactly what is to be centralised will be specified in the Regional Level Agreements.

Access to health services is viewed as a highly valued condition of service; however this must be balanced against the efficient use of a diminishing, costly, and increasingly scarce health workforce. For example, many Army garrisons have multiple Regimental Aid Posts on the same base or in close proximity. Similar duplications occur for inpatient facilities in some locations.

The 2004 Stevens' Review concluded that – *'brigading health resources at a single site would improve technical and financial control of the delivery of NSA (garrison) services. It would also cater for*

the clinical supervision and support of health staff, provide the opportunity for peer support, assist in focussing staff on health delivery rather than administrative functions, and assist the ADF in maintaining accredited facilities on bases, and thus with the delivery of quality services.' Unfortunately, centralisation of resources in line with the above recommendations has generally not occurred.

Consolidation of garrison health assets will enable better utilisation of personnel and materiel resources, especially in regions where health providers are scarce. Consolidation of the health workforce within multi-disciplinary delivery hubs also has the potential to positively influence retention of uniformed health professionals through:

- economies of scale,

- coordination of clinical workloads,

- closer supervision and mentoring of junior health staff, and

- improved team-based care in line with emerging national models.

This model also provides greater supervision and training of Medical Assistants by Medical and Nursing Officers, and civilian contractors.

Recommendation 7

COSC agreed that CJHLTH is the Lead Capability Manager for health materiel.

Health materiel for both new capability and sustainment is managed by Army, through the DMO, with new health capability requirements competing with other Army Minor Projects. This creates Service tensions arising from specialised single Service requirements which are not well understood outside the health fraternity. Due to the technical nature of this equipment it is often difficult for lay personnel to appreciate or comprehend the importance and priority of the requirement.

Health materiel, like information and communications technology, has rapid development and obsolescence cycles. The current Medical and Dental Equipment Demand system for Managed Assets has created inordinate delays as the procedure subjects health materiel to the same process as other commodities. The effect is that minor new health capability is delayed for possibly two years from the time of identifying the requirement to acquisition. In this timeframe, technology and care standards have inevitably progressed.

There are very few health subject matter experts within both the current Lead Capability Manager's organisation and the Health Systems Program

Office, resulting in possible wastage of funds. A recent example was a demand for pulse-oximetry equipment. There are two common types used within Defence, namely hand-held and finger pulse-oximeters. Instead of providing compact finger pulse-oximeters, hand-held units were supplied, which did not meet the user requirement.

The resolution of these types of problems lies in having subject matter experts as the ADF capability manager for health materiel. Allocating CJHLTH as the lead capability manager for health materiel would provide the subject matter expertise required to ensure optimal equipment solutions in the rapidly advancing field of health materiel. It would also ensure minor health projects receive the joint backing they require, as most health materiel is joint in nature.

Recommendation 8

CDF invite CIO and CCD to investigate commercial-off-the-shelf eHealth products to provide a fast-track interim solution to the lack of a comprehensive health information system.

Defence agreed ANAO Recommendation 12 that *'Defence develop systems to monitor and control all expenditure on health services and that up-to-date information on the full costs of providing health services be maintained.'* Similarly Defence agreed ANAO Recommendation 14 that *'Defence accord a high priority to the development of effective ADF-wide health information systems, and examine options for accelerating the implementation of an electronic patient record with outpatient, inpatient, dental and financial sub-systems.'* Neither of these recommendations has been implemented.

Currently Defence has two competing eHealth systems (HealthKeys and MIMI), neither of which meets clinical user requirements or the health services needs. These systems are not universally deployed and, without effective health information systems, clinical-level risk is increased. For example, it is very difficult to flag and manage mental health issues when service personnel return from operations and are posted to a new locality and unit because some units use paper-based records, and others HealthKeys or MIMI. Further, it is almost impossible to aggregate data to make informed management decisions. The Health Services remain severely limited in their ability to provide aggregated data on fundamental governance issues, such as the number of service personnel who have mental health or medical conditions resulting from operations in a specific theatre.

The current Review has identified a range of

commercial-off-the-shelf options. Clearly a full analysis of the user requirements and the development of properly costed options are necessary. However, it appears an interim fast-track solution may be available, pending JP2060 Phase 3 delivery of a system that integrates both garrison and deployable eHealth and knowledge management requirements. The Rapid Prototype Development Evaluation process within the Chief Information Officer Group is being used to assess the options available.

Recommendation 9

COSC agree that CJHLTH sponsor a review of Area Health Services personnel and equipment establishments, and examine in detail alternative models to deliver garrison health support.

The current Review into the Health Services is required to identify a clinical service delivery model or models. All the possible options will be explored. Alternative models of service delivery to support garrison health requirements could include the outsourcing of all garrison health support, national contracting models through prime vendors, single Service delivery models, or combinations of these. Each of these options, or combinations of options, will require differing Area Health Services personnel and equipment establishments. There is also scope to reduce the number of Area Health Services from nine to four or five. Joint Health Command will sponsor a review of all Area Health Services personnel and equipment establishments.

Recommendation 10

COSC agree that CJHLTH examines alternative operational health delivery models as part of the ongoing JP2060 PH3 development process.

The first of a series of meetings on this took place on 16 September.

Additional requirements from the Defence Health Review include:

- the confirmation of current deployable health force structure against strategic guidance, capability Directives and concurrency requirements;
- examination of the current validity of JP2060 planning guidance for health support to deployed operations; and
- examination of the current health-force order of battle structures for the single Services.

There is wide agreement that JP2060 team-based health capability bricks remain suitable for deployable capabilities, with some modification

required. There is also agreement that most of the 1 500 tasks identified in the original JP2060 study remain relevant. Those tasks that are not relevant have previously been identified as personnel and logistic functions that belong elsewhere.

A review of the current team-based health capability is underway and will also examine the future direction and likely developments of military medicine in the next 10-year period.

Priorities for Joint Health Command

There is wide agreement that the vulnerabilities which the Defence Health Services face are:

- *command, control, and governance arrangements;*
- *data and information, in particular the absence of an effective eHealth system;*
- *garrison healthcare delivery and its ever-increasing costs; and*
- *the healthcare provider workforce, both uniformed and contracted.*

In order to effectively and efficiently achieve the Joint Health Command outcomes with the finite resources available, the following priorities have been identified:

Priority 1. Clarify command, control and governance arrangements for the delivery of garrison healthcare.

Priority 2. Ensure garrison health delivery is as efficient and effective as possible.

Priority 3. Implement an eHealth system that meets community norms at the clinical provider level, and can be data-mined for aggregated corporate data.

Priority 4. Assure the mental health of ADF personnel.

Priority 5. Develop the organisation required to assume responsibility as the Lead Capability Manager for health materiel.

Priority 6. Examine operational health delivery requirements.

Priority 7. Develop professional development opportunities for ADF health professionals which meet the operational requirement and aid retention.

Priority 8. Reinvigorate the Reserve health force.

These priorities will form the skeleton upon which the JHC Strategic Plan will be built that will guide the Command's endeavours over the next few years. The establishment of the Joint Health Command is a major change in the way the Defence Health Services do business but it has the potential to make a significant, positive effect on the way that health care is provided throughout the ADF, both in garrisons and bases and deployed on operations.

This is a big agenda and a mighty challenge for all those involved in seeing it through to fruition.

2008 AMMA Conference Abstracts

Keynote Presentation

From the ground up – Setting up a post-reconstruction aeromedical service for the Iraqi Air Force

COL Rolland Reynolds

In the late 1980s, Iraq had the sixth largest air force in the world, with more than 1,000 planes. Operation DESERT STORM and a decade of sanctions obliterated that force. In 2003, no Iraqi aircraft flew against the Coalition, and the training infrastructure had been dismantled. The Coalition Air Force Transition Team (CAFTT) was established in 2005 to train, advise and assist the Government of Iraq in rebuilding an independent and viable Air Force.

As the fledgling Iraqi Air Force (IqAF) grows, there is an increasing need for competent medical officers with specialty training and expertise to perform such duties as aircrew medical exams, support an aeromedical evacuation system, determine suitability for flight duties of aircrew with a variety of medical problems, and provide direct medical support to

flying operations at Iraqi Air Force bases. Iraqi Air Force pilot shortages are driving an immediate requirement for medically-qualified pilot candidates, and shortages of medical officers trained in aviation medicine adversely impact the expeditious screening and qualification of these individuals.

This presentation will address the initial challenges facing Iraqi and Coalition leadership in developing aeromedical support to the Iraqi Air Force during the first three years of CAFTT operations. Specific issues included medical manpower and equipment packages to support IqAF bases, equipment and locations to perform entrance medical examinations, initial planning for an aeromedical evacuation capability, and training for an initial cadre of flight surgeons.

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Health Safety and Human Factors

Parachute injuries in the Australian Airborne Battle Group from 1992-2005

MAJ Sam Hay

Australia first trained paratroopers during World War I; however, it was not until the 1980's that a permanent force has been maintained. Through this presentation, MAJ Hay will present current injury data from static line parachute operations by the Airborne Battle Group (ABG), with direct comparison to Australian data from 1992, and crude international data.

A retrospective audit of parachute operation manifests and Unit Medical Records was conducted for all descents by the ABG in 2004. 585 paratroopers conducted 1985 static line descents, with an overall injury rate of 15.3/1000 descents. Tactical exercise

descents (TEDs) see the greatest injury rate at 32.6/1000, significantly greater than clean fatigue (CF) descents at 10.3/1000 ($p < 0.025$). Comparison of Australian data reveals a significant increase in the reported rates from that of Farrow in 1992 for non-TEDs (5.4 to 10.6/1000, $p < 0.05$); plus, a trend to increased injuries in TEDs (16.6 to 32.6/1000, $p < 0.2$). Comparison with international crude rates see an increase in injury rates of up to 5.8 times in this study.

Potential explanations for the increased rates will be explored, with some recommendations made for reducing injuries into the future.

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Secular changes in body dimensions of Australian Defence Force aircrew (1971-2005)

Adam Clark, Grant Tomkinson, Peter Blachonette

Given that the size of workspace (cockpit) environments have been stable over time, and with a number of RAAF aircraft having ejection capabilities, knowledge of secular changes in body dimensions is essential for the future design of cockpits and the prediction of future human-equipment interactions. The aim of this study is to quantify the secular changes in body dimensions of RAAF aircrew (males aged 18-40 years), using two large anthropometric surveys from 1971 and 2005.

In 1971, physically-measured anthropometric data on 13 body dimensions were collected on a sample of 482. In 2005, comparative physical and digital data (extracted from whole-body scans generated using a 3D laser scanner) were available for the same body dimensions on approximately 250 aircrew. Following primary data treatment, which included correcting digital to physical measurements and correcting for differences in measurement protocols, an age-matching procedure was employed. Secular changes between 1971 and 2005 were then examined using unpaired t-tests, with all changes expressed as relative changes by representing the absolute change as a percentage of the 1971 mean value.

Secular increases were observed for most body dimensions, including height (95% CI +0.2% to +0.6% per decade), mass (95% CI +1.2% to +2.8% per decade), body mass index (95% CI +0.5% to +1.8% per decade), sitting height (95% CI +0.2% to +0.7% per decade), upper leg length (95% CI +0.1% to +0.5% per decade), waist girth (95% CI +0.3% to +1.4% per decade) and hip girth (95% CI +0.1% to +0.8% per decade). These are small to moderate changes.

With clear evidence of larger and heavier aircrew, the results of this study have obvious implications for the future design of cockpits and the prediction of future human-equipment interactions.

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The effect of pre-natal exposure to high doses of Toluene on the development of the hearing apparatus

Rachelle Warner

In view of the high level of public concern regarding solvent exposure during pregnancy, and the clinical and epidemiological evidence suggesting a possible link with adverse pregnancy outcome, the aim of this project was to determine whether a repeated high dose of toluene, an organic solvent commonly used as a substance of abuse, produces adverse outcomes, including cochlear defects, using the foetal rat as a model with the view to extrapolate this risk to humans.

Toluene was chosen because the relative ease of accessibility, low cost and misperceived lack of addictive qualities of toluene and other solvents has led to its abuse becoming a worldwide practice, and is a problem primarily affecting lower socio economic groups. Solvent abuse during pregnancy results in a clinical pattern of malformations including deafness. As the Australian Defence Force becomes more active in Humanitarian Aid missions, particularly in third world and lower socio-economic countries, the likelihood of our medical teams encountering solvent abuse and related birth defects increases.

Sixteen pregnant rats were given either 1250 mg/kg of toluene in peanut oil or an equivalent amount of peanut oil by gavage from gestation day (GD) 16-19. Dams were monitored for signs of toxicity and euthanized on GD20. A pattern of accelerated development in the treated cochleae was observed using the TUNEL Assay. Reduced placental weight, and maternal and foetal kidney pathology provide additional evidence that toluene abuse induces adverse pregnancy outcome and that the foetal cochlear may be a target of toluene toxicity.

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ADF Rehabilitation Program – outcomes and experiences

Jim Porteous

The Australian Defence Force Rehabilitation Program (ADFRP) was successfully implemented across all Area Health Services in Australia during the period June to September 2006. In the first year of operation, there were 5,096 referrals for rehabilitation assessment. In the first nine months of FY07/08 there were 3,072 referrals for rehabilitation assessment.

The number of referrals to ADFRP validates the original estimate that 10 percent of the ADF permanent forces may need rehabilitation to return them to maximum effectiveness within the ADF environment, or if this is not possible and all other avenues are exhausted, the civilian environment.

In terms of program outcomes, the ADFRP in its first 12 months of operation had a successful return to work (i.e. retained in the ADF) rate of 89%, which exceeded the national jurisdictional average of 77% and Comcare's return to work rate of 85% for FY06/07. This is despite the much higher levels of post injury or illness medical and physical fitness required by the ADF when compared with civilian agencies.

ADFRP has also had good outcomes in terms of improving retention and decreasing the need for disability pensions.

This paper will examine what we have achieved and where we go next.

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Governance audits in a Defence area health services (or the evolution of the Tigger Team)

Darrell Duncan, Vicki Sukkar, Gordon Stevens, Peter von Saldern

In January 2007 three Defence Area Health Services were joined in what is now called the Area Health Service Greater Sydney and Northern New South Wales under the charge of a single Senior Health Officer. Combining three geographically disparate Area Health Services into the one 'super' AHS with

responsibility for approximately 1/4 of all ADF personnel was without precedence and a strategically ambitious project. Under guidance from the SHO's 'first steps approach' it was decided to undertake a rapid review of all health facilities in the Area. The Health Systems Managers undertook a program of facility reviews that identified variations in structures, resources and, critically, in the delivery of health care.

The identification of previously unidentified or unmitigated risk to patients, staff and to the SHO (and in turn DJHSA and HDHS) led to the conclusion that there were indefensible systemic corporate and clinical governance shortfalls across the AHS.

Concurrently, a review of the roles, tasks and structures of the AHS Headquarters in the new organisation identified the need to have systems in place to exercise the required levels of governance across the new Area.

The response to these reviews was the development of a clinical and corporate governance audit tool and the formation of what is affectionately known as the Tiger Team. By direction of the SHO the approach adopted was to develop a comprehensive tool that could be tailored to a specific facility, incorporating facilitation of improvement in facilities as opposed to a blunt 'pass or fail assessment'.

The process, in keeping with the technical control responsibility and the SHO's guidance, is not designed to assign blame or to be a punitive instrument – rather it is devised to highlight previously unknown or organisational issues not always visible at unit level (for example the performance of garrison support contract providers) and to support facilities as they take corrective action through the appropriate channels.

The scope of audit for the Tiger Team included but was not limited to the elements of technical control including clinical governance and infection control, corporate governance and regulatory compliance (OH&S), human resources, logistics and equipment, garrison support, Command and Control, and risk management.

The audit process will be outlined and issues around applying this across the broader Defence Health Services will be discussed.

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The First Australian Aeromedical Evacuation using C17 Globemaster

Andrew Pearce, Andrew Cohn

Improvements in aeromedical evacuation capability for the Australian Defence Force has come a long way in a short time. Military Critical Care Aeromedical Evacuation Team (MCAT) training now provides a systematic integrated approach to provide critical care in the air. How then do we utilize these trained teams on long haul missions? The core culture of our training is safety, how do we apply this on missions across several continents, changing time zones, departing at odd hours, vast climate changes and challenging dietary intake.

We have recently completed two successful missions to bring wounded Australian soldiers back from the Middle East Area of Operations. The organization, planning and execution of these missions utilizing MCAT equipment on the C17 airframe with AME and MCAT teams provided numerous logistical challenges. This was the first mission on our latest air asset acquisition the C17 Globemaster, longer range, greater cruising speed and larger payload area. The medical fit out is the same as used by the American Critical Care Aeromedical Evacuation Teams (CCAT) and this was the first use of the equipment outside of training. Our use of liquid oxygen for therapeutic supply is a first and whilst offering many positives can also provide challenges for the team.

The ability to plan and preposition slip teams, crew rest hours, team briefing on route and receiving constant medical updates helped ensure a safe and

rewarding mission. This was also emphasized in doing two missions within three weeks with a mix of previous and new crew on the second mission to increase the team exposure. The lead in times also differed with initial mission having three hours notice to move and the second around 48 hours notice.

Our ability to communicate within the teams as well as outside provided challenges as well as impetus for improvements. The ability for training staff to integrate with the operational teams also allowed validation of training and the ability to look at lessons learned not in isolation but as a dynamic process to shape upcoming courses. Crew duty limits and team resource management are key components to a successful mission and underpin the principles taught on AME and MCAT courses. Does rest on board the aircraft on a stretcher constitute proper rest?

This capability is an integral part of our health response in support of the numerous current overseas deployments. The current operational tempo has resulted in increased AME missions requiring well trained teams that understand the limitations of the team, their equipment and the information provided to them. Our ability to provide this ongoing capability rests with the important work done through the Health Operations Conversion Unit (HOCU) at RAAF Amberley and Operational Health Support and Training flight (OHS and TF) at Richmond.

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Workforce

Stepping out from behind the wire - Lessons identified from the move of Balmoral Naval Hospital to St Vincent's Hospital

Nigel Carlton

Since a structural audit in 2004 identified a need to refurbish the existing facility, Balmoral Naval Hospital (BNH) has been anticipating a major refurbishment project. Funding for the current refurbishment was made available in FY07/08 and the project quickly took shape. Whilst not returning to a full surgical hospital, the refurbished Balmoral Naval Health Centre (BNHC) will continue to provide Outpatient, Specialist, Treatment, Physiotherapy, Dental and Pharmacy services in support of base activities at

HMAS PENGUIN. The facility will also provide a 10 bed low dependency rehabilitation facility, the capability yet to be defined.

In the interim, the Navy hospital has been relocated to the Navy Ward at St Vincent's Hospital, Sydney. Sited within this major metropolitan hospital in Darlinghurst, the Navy Ward is ideally located to take advantage of the health service available in this state of the art complex, all within walking distance of Fleet Base East. Access to digital radiology, online pathology, bedside specialist consults, emergency and surgical services in a modern hospital setting has change the way Navy delivers health care to its members. A Strategic Alliance Agreement covering training placements will also greatly enhance the

clinical preparedness of health staff in support of their role on the Primary Casualty Reception Facility and in other operational health support tasks.

This paper looks to discuss the lessons identified from such a complex and radical change to the way Navy and Defence Health delivers health care to ADF members.

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Applying the RAAAKERS framework in an analysis of the commence and control arrangements of the ADF Health Service

Mark Burnett and Graham Durant Law

The Defence Health Services (DHS) in Australia operates in a complex relationship between a geography-based National Support Area (NSA) health care model in which many of the medical resources and staff are owned by the single services, and a National health care system that provides primary, secondary and tertiary health care both to the NSA and to deployed forces.

The Alexander Review, amongst other things, was required to inform the development of a command and technical control structure for health units that optimizes operational efficiency and effectiveness, and clarifies accountability to the Service headquarters and other Groups in the ADF. The RAAAKERS (Responsibility, Authority, Accountability, Awareness, Knowledge, Experience, Resources and Systems) framework was used as an analysis tool to assist in understanding the main command and control stress points in the DHS. Structured interviews with many of the key staff in the DHS allowed the RAAAKERS construct to probe into the alignment of elements related to command capability, such as the RAAA attributes, and those associated with elements of control, such as the KERS attributes. In particular the paper shows how data from the interviews enabled construction of RAAAKERS metrics to highlight problematic areas related to technical control and to a lack of alignment in Responsibility, Authority and Accountability in some areas of the DHS.

The Viable Systems Model (VSM), developed by operations research theorist Stafford Beer, is a model of the organisational structure of any viable or autonomous system. As an additional analysis tool for the Alexander Review, VSM techniques were used

to study the DHS and to determine the structure of the five internal systems needed for viability. This preliminary study also indicated stress points in the technical control aspects of the DHS and provided some support to the findings of the RAAAKERS investigation.

Overall, we found that implementation of the RAAAKERS framework made explicit many command and control stress points in the DHS and provided some useful insights into the management of a large and very complex organisation.

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Recruitment, retention and employment of Medical Officers: Is it a time for a paradigm shift

Jon Lane

Recruitment and retention of Medical Officers (MO's) within the Australian Defence Force (ADF) has been problematic for some years now. This paper is intended to stimulate informed debate by examining the issues from a sociocultural context. It suggests that the ADF is working from education and employment norms last seen in the 1960's, and that civilian medical practice and ADF MO employment roles have diverged so significantly that MO's actually must leave the ADF in order to pursue a medical career. This has resulted in the workforce shortages currently seen. These issues are complex, but are readily demonstrated by examining the distinct differences between ADF and civilian medical workforce practices in terms of operational requirements versus MO clinical competencies, specialist requirements, and general medical practice. These same issues are also evident in the differences between base and deployable (Land Force) health delivery. The ADF is a niche employer with specific needs, and now operates on a model that is not reflected anywhere in civilian medical practice. In short, the ADF recruits non-specialist MO's via the sponsorship scheme, supports them through their initial post-graduate years, and typically they then leave. In reality however, the ADF requires specialists (GPs, Intensivists, Surgeons, etc) for health delivery in both base and operational roles, and it is here that the shortfall in personnel is most keenly felt.

This article suggests that the systemic stagnation can be resolved with reference to civilian workforce practices (eg locum employment agencies), and through better utilisation of specialist Reserve Force personnel through specific periods of full time service. The ADF is simply not large enough to sustain full-time employment of the required

specialists, nor is it necessarily desirable to do so, however we do have the capacity to employ specialist MO's for specific activities (eg deployments, specific staff roles, etc). A suggested model based on utilisation of Reserve Force members includes targeted recruitment strategies aimed at specialists which encourages them to be employed on a full time basis for specific periods of time, (eg three months per year), on a regular basis (ie annually). This would allow for more flexibility and forecasting from a workforce planning perspective, as well as reduced financial cost for the benefits and capabilities gained by the ADF. Finally, as stated previously this article is intended to increase both understanding and discussion of the major workforce issues facing ADF MO's – why is there such a shortage of MO's; how do we attract and retain more; and how do we effectively utilise the specialists we have?

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Defence health workforce capability – Who pays for CPD?

Kerry Clifford

In 2007 the speaker published an paper entitled “The challenge of continuing professional development for ADF Nurses” in the ‘ADF Health’ journal (vol 8, Nov 2007, pp:57-59). The article identified challenges in providing for ongoing professional development. The article noted that these challenges arose from professional codes of conduct, ethics and competencies, individual and workplace competency requirements and, potentially, from compulsory reporting of ongoing professional development under the national health profession regulation initiative.

Since the time of writing, the DHS responsibilities to CDF and the Service chiefs for ensuring that all activities and personnel of the Defence Health Service meet national expectations and professional obligations have become even more challenging with regard to workforce recruitment and retention, clinical competence for practice, skill mix utilisation and health system governance.

In taking a broad approach, this paper will examine issues faced in sustaining the existing ADF health workforce and discuss issues of current concern arising from both the internal and national health workforce environment of note for all health professionals before attempting to answer the crucial question of “who is responsible for health professional ongoing professional competency, and therefore, who pays?”

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The management of Specialist Service Officers within the Australian Defence Force (Army) and how it could be improved

Emma-Jayne Grigson

There is a recurring question of “how we know what we know” and this question can become pivotal in the decision making processes within clinical areas. Within Defence this is even more paramount, with much of what we take for general knowledge, having been taught – or indoctrinated – at some stage throughout the career of a GSO. The knowledge that we take for granted due to heavy exposure and indoctrination processes is not general knowledge to those who step in at the Officer level; due to the lack of exposure to military training and administrative processes. Therefore this question of “how we know what we know” becomes critical when looking at a new structure for the SSOs.

Further to this is the fact that within a Defence environment, clinical practitioners must have the capacity to understand all the thoughts processes that are competing within that environment – military, ethical procedures, clinical information and management issues. They should be able to conduct activities through all the various stages of practice: data gathering, analysis, problem solving, ethical decision making, management of situations and their clinical speciality. In line with this suggestion, a recommendation is that the induction training for SSOs needs to cover such an extensive range of areas and topics – that is, all contributing elements to clinical practice and management within Defence. The resultant product would be a training program matched to the entry level of rank for the SSO; a training program that would cover all the management, leadership, and administration that is expected of them in a military capacity due to their rank. This training would be in addition to their Health military training, but separate from it.

The suggestion is that SSOs gain rudimentary training in command, leadership, administration and management prior to receiving a commission – in order to allow them to benefit from their clinical experience (through Rank) but to perform to the standards that their rank imposes on them. The distinction between giving rank before training and after training is easy to make: giving the rank before training ensures that you set the SSO up for failure – due to the fact of you

have not given them the tools with which to wield the power of their rank. By withholding rank until military based leadership/management training is complete you gain two benefits: firstly, you ensure that the members actually complete this training and secondly, you ensure they have the knowledge and skills to perform at their rank level.

Within Defence our medical professionals should hold responsibility for ethical practice within their certain areas. There should be a split of the responsibility along lines of clinical and medical expertise as well as along the lines of ethical responsibility; ensuring clear direction and distinction of duties. In terms of the management of the personnel themselves, this would enable GSOs to act as managers and administrators only, without the worry of clinical or ethical issues. It would also result in the responsibility for abiding by medical ethic codes, rests with the expertise in that area, SSOs – and not with members who may not have knowledge of this ethical code.

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Navy Ward at St Vincents: A healthcare model providing benefits to both the ADF and St Vincents Sydney

Glen Farrow

St Vincent's Hospital Sydney (SVH) is a 150 year old institution owned by the Sisters of Charity and provides public health care services to NSW Health. SVH has a long history of involvement with Defence setting up a small Navy ward prior to Federation, providing support to the visiting British and French fleets post Federation and establishing a rehabilitation service for returned servicemen after WW1. During WW2 the armed services established their own

hospitals, reducing in size over the years into the Repatriation system. Now all three services contract out the majority of complex healthcare and surgery in the ASA, maintaining small low acuity ASA hospitals with deployable health elements.

In August 2005 SVH began to explore opportunities to redevelop a vacant hospital building on campus. At the same time it was evident that Balmoral Naval Hospital was in need of refurbishment. Initial meetings confirmed that both organisations had similar cultures with strong mission and values. The local Area Health Service-Sydney was contracting out nearly all complex surgery and medical inpatient work to the private sector, at high cost and with multiple providers. In addition Defence Health was seeking opportunities for further education and training of health staff in the civilian sector.

An EOI was conducted in the Sydney area in October 2005 with the view of testing the market amongst tertiary hospitals. St Vincent's was successful, offering a "one stop shop" concept of health care. The proximity of SVH to Fleet Base East and Victoria Barracks offered a single point of contact for nearly all the health requirements provided out of BNH, with the advantage of far less travel for defence members, a choice of public or private sector treatment on the one campus and quicker turnaround for treatment. In addition a single overarching agreement with the local Area health Service offered simplicity in contract management.

This presentation will describe the evolution of this project, the advantages for SVH and for the ADF and the possibilities going forward of greater collaboration between the DHS and tertiary health services.

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Perspectives in Deployment and Data Deployment Health Surveillance

The Australian Defence deployed East Timor and Bougainville health studies: methodology, data sources and response

Susan Treloar, Cate D'Este, Annabel McGuire, Peter Nasveld, Colleen Loos, Michael Waller, Christine McClintock, Desley Kassulke, Annette Dobson, Philip Ryan, Alexander McFarlane

Background: The Defence Deployed Bougainville Health Study and the Defence Deployed East Timor Health Study are part of a series of studies that aim to research the health and well-being of Australian Defence Force (ADF) veterans who have deployed on active service overseas. They are being conducted by the Centre for Military and Veterans' Health (CMVH) as part of the Deployment Health Surveillance Program (DHSP).

Aims: The aim of the DHSP is to examine the physical, emotional and environmental effects of deployment in order to identify, prevent and manage health care needs of current and former ADF members. The aim of the Bougainville Health Study and the East Timor Health Study is to investigate the health status of Australian Defence Force personnel who deployed to Bougainville and East Timor relative to two frequency matched comparison groups who did not deploy.

Methods: Both studies include analysis of data gathered from mortality and cancer incidence registries, a comprehensive self-reported questionnaire, and health and psychology records retained by the ADF. All 4775 ADF personnel who deployed to Bougainville between November 1997 and June 2003 as part of Operations BEL ISI I & II were invited to participate in the Bougainville Health Study. A comparison group of 2363 individuals who were eligible to deploy to Bougainville but did not were also invited. A sample of 3998 ADF personnel who deployed to East Timor between June 1999 and May 2005 as part of Operations FABER, SPITFIRE, WARDEN, TANAGER, CITADEL and SPIRE were invited to participate in the East Timor Health Study. A comparison group of 2501 individuals who were eligible to deploy to East Timor but did not were also invited. Some individuals participated in both studies.

Invitations to participate in the study were sent by email or mail. Consent and survey could be completed online or on hard copy. Individuals were asked to consent to linkage between specific sources of data. The planned strategy was to access medical record data for currently serving personnel via the Unit Medical Record (UMR), because of vaccination data therein, but the strategy required review. Defence psychology data were provided electronically. Data collection took place from December 2007 to July 2008.

Results: Response to the survey, consents to linkages, availability of records and logistic challenges are described.

Conclusions: We review lessons learned for health surveillance through experience of conducting these studies.

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Utility of various data sources for health surveillance in Defence – the DHSP experience

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Introduction: Secondary use of health data collected primarily for clinical purposes is widely employed as a cost effective and non-invasive means of conducting epidemiological surveillance. It is recognized that such data do not always meet the highest standards of epidemiological rigour but what can also be overlooked is the actual cost of retrieving the data. This paper will compare the completeness, validity and cost of use of Defence health and psychology data compared to purpose specific self report data collection.

Methods: As part of the Deployment Health Surveillance Program (DHSP), 500 Solomon Islands veterans and 500 personnel who were in the Australian Defence Force at the same time but did not deploy to the Solomon Islands (comparison group) were included in a sample to study health effects of deployment to the Solomon Islands. Data were collected from existing Defence health and psychology data sources and from a project specific questionnaire.

Results: The overall response rate for the project-specific health survey was 44%. The proportion of participants for whom Central Medical Records were retrieved was 94%. On average 73% of the sample had an Annual Health Assessment (AHA) and/or a 5-yearly Comprehensive Preventive Health Examination (CPHE) available for analysis.

From those who consented to linkage to psychology records, the proportion retrieved ranged from 27% for Post Operational Psychological Screening (POPS) data to 71% for Return to Australia Psychological Screening (RtAPS).

Conclusions: There are significant advantages and disadvantages in the use of existing data for epidemiological surveillance in a Defence setting. Recommendations regarding optimal use of this data in conjunction with purpose specific sources will be made.

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Cigarette smoking and military deployment: prospective evaluation of smoking among a large population-based US Military Cohort

Besa Smith, Margaret Ryan, Deborah Wingard Thomas Patterson, Donald Slymen, Caroline Macera

Background: Smoking is the leading preventable cause of death in both Australia and the United States. In the US, more than 400 000 people die each year due to smoking related causes, with an attributed \$167 billion spent in annual health-related economic losses. Smoking rates are higher in the US military where an estimated \$130 million is spent each year on excess training alone due to smokers who are prematurely discharged. Furthermore, smoking has implications for military readiness since service members who smoke have lower fitness levels and are at greater risk for physical injury. Occupational stress related to serving in the military has been reported as a strong predictor for cigarette smoking and nicotine dependence. Stress of military deployment may compound military occupational stress and manifest in coping behaviours such as cigarette smoking.

Objective: To prospectively describe smoking initiation among never smokers, smoking recidivism among past smokers, and change in daily smoking among smokers, in relation to military deployment.

Methods: Launched prior to September 11, 2001 and the start of the wars in Afghanistan and Iraq, the Millennium Cohort Study is a 21-year longitudinal study designed to study health outcomes associated with US military service in a cohort of over 150,000 US military personnel from all branches of service as well as regular active duty, Reserve, and National Guard and to follow up even after separation from military service. Participants in the current study (N = 48 378) submitted baseline data (July 2001-June 2003) before the current military conflicts in Iraq and Afghanistan, and follow-up data (June 2004-February 2006) on health measures. Smoking initiation was identified among baseline never smokers; smoking recidivism was identified among baseline past smokers; and increased or decreased daily smoking was identified among baseline smokers.

Results: Among never-smokers, smoking initiation was identified in 1.3% of nondeployed and 2.3% of deployers. Among past smokers, smoking recidivism occurred in 28.7% of nondeployed and 39.6% of deployers. Smoking increased 43.8% among nondeployed and 55.6% among deployers. Other deployment factors independently associated with postdeployment smoking initiation included deploying for longer than 9 months, multiple deployments, and

combat exposures. Among those who smoked at baseline, deployment was not associated with changes in daily amount smoked.

Conclusions: Military deployment is associated with significant increases in smoking initiation and recidivism, particularly among those with prolonged or multiple deployments, or combat exposures. Long-term morbidity associated with smoking makes prevention programs focused in these high risk populations of critical public health importance.

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Do Defence personnel smoke and drink more than other Australians? Rates of smoking and alcohol consumption in a sample of Defence personnel compared with Australian norms

Desley Kassulke, Christine McClintock, Michael Waller, Annette Dobson

The health risks, social and economic costs of smoking have been well documented and although there may be safe levels of alcohol consumption, excessive or inappropriate consumption can also lead to short term and long term health risks. Both risk factors contribute to increased morbidity and mortality and are potentially amenable to health promotion interventions.

The Defence Deployed Solomon Islands Health Study was conducted in 2007 to assess the health and well being of Australian Defence Force veterans who had deployed to the Solomon Islands. The health of these veterans was examined together with a comparison group of Defence force personnel who were not deployed. Data on rates of smoking and alcohol consumption were collected as part of this study.

Since defence personnel may have increased access (including reduced costs) to cigarettes and a sub culture that may support smoking and hazardous alcohol consumption, we set out to compare the prevalence of smoking and level of alcohol consumption in Defence Force personnel with Australian norms.

The study revealed no significant differences in smoking behaviour and alcohol consumption between Solomon Islands veterans and the comparison group. Overall 19% of participants in

the Solomon Islands study currently smoked and similar to Australian norms, the highest proportion of smokers was found in the 20-29 years age group. While there were no significant differences between Defence personnel and the Australian population in relation to smoking behaviour, some significant differences in alcohol consumption were observed. Comparisons of short term and long term alcohol-related risk were limited by differences in questions used by the Solomon Islands study and those used in assessing Australian norms.

These findings support the extension of programmes and strategies that are aimed at the reduction of health behaviour risk in Defence personnel.

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Changes in alcohol use and alcohol related problems in a large military cohort: Prospective investigation comparing pre- and post- military combat deployment

Isabel Jacobson, Margaret Ryan, Tomoko Hooper, Tyler Smith, Paul Amoroso, Edward Boyko, Gary Gackstetter, Timothy Wells, Nicole Bell

Background: Concern has grown over the health of US service members returning from deployment in support of the wars in Iraq and Afghanistan. High rates of alcohol misuse after deployment have been reported among personnel returning from past conflicts, yet prospective investigations focusing on alcohol misuse after returning from the current conflicts are lacking.

Objectives: The purpose of this study was to determine if those who deployed with self-reported combat exposures in support of the wars in Iraq and Afghanistan were more likely to experience new-onset or continued alcohol consumption, binge drinking, and other alcohol-related problems, compared to those who did not deploy.

Methods: The Millennium Cohort Study is a population-based, longitudinal study designed to evaluate the long-term effects of military service. Launched in 2001, 77,047 participants who provided informed, voluntary consent were enrolled in the study. Of these participants, 55,021 were followed up from June 2004 to February 2006, providing a response rate of 71.4%. For the purposes of these analyses, only those

55,021 participants who provided baseline and follow-up data were used. After excluding participants with missing outcome, exposure, demographic, and covariate data, our analyses included 48,481 participants. Prevalence of heavy weekly drinking, binge drinking, and alcohol-related problems were examined at baseline and follow-up. Multivariable logistic regression was used to assess whether those deployed with self-reported combat exposures were more likely to experience new-onset or continued heavy weekly drinking, binge drinking, and other alcohol-related problems, compared to those who did not deploy.

Results: Reserve and National Guard personnel who deployed and reported combat exposures were significantly more likely to experience new-onset heavy weekly drinking [odds ratio (OR)= 1.64, 95% confidence interval (CI): 1.36, 1.97], binge drinking (OR=1.43, 95% CI: 1.22, 1.68), and alcohol-related problems (OR=1.59, 95% CI: 1.29, 1.96) compared to nondeployed personnel. Active duty personnel were also at increased odds of new-onset binge drinking (OR=1.29, 95% CI: 1.13, 1.48). Other characteristics significantly associated with new-onset or continued alcohol problems among both Active Duty and Reserve and National Guard personnel were younger age, female gender, white race, past or current smoking, and a history of mental disorders or alcohol misuse prior to baseline.

Conclusions: Reserve and National Guard personnel that deploy and report combat exposures are at increased risk of new-onset of heavy weekly drinking, binge drinking, and alcohol-related problems after returning from deployment. Enhanced training for Reserve and National Guard personnel to better prepare them for combat exposures and age-appropriate interventions targeted at younger service members should be considered to prevent uptake of drinking after deployment

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Are there difference in mental health, as measured by K-10 and PCL-C, depending upon where, when and who asks the questions?

Annabel McGuire, Michael Waller, Cate D'Este, Alexander McFarlane

Introduction: The Solomon Islands Health Study is the first study in a program of research on deployment health conducted by the Centre for Military and Veterans Health (CMVH). The program aims to evaluate the consequences of deployment on both physical and mental health. Initial analysis demonstrates that mental health, as measured by K-10 and PCL-C, differs for some participants depending upon whether the data was collected as part of routine Return to Australia Psychological Screens (RtAPS) conducted by Defence or collected by CMVH.

Methods: Data from participants who consented to linkage between their Defence RtAPS data and their self-reported data (collected by CMVH) and who had complete data from both sources (N = 96) were compared using the Kappa statistic of agreement.

Results: Thirty-one percent of participants had a higher and 7.5 percent had a lower K-10 category score on the self-report data collected by CMVH compared to their RtAPS data (Kappa statistic of agreement = 0.25). Similarly, 22 percent of participants scored in a higher PCL-C category on the self-report questionnaire compared with RtAPS (Kappa statistic of agreement = 0.28).

Conclusions: Multiple plausible reasons for these differences include:

1. Variations in the timing of the data collections and the possibility that time (e.g. opportunity for impact to develop) or events since the collection of the Defence owned data, have exacerbated, or mitigated, the outcomes.
2. Differences in the environment in which the data are collected. For example, participants may have felt inclined to be more open in their responses to the self-report questionnaire because they were able to complete it in a more private environment. Further, the fact that the survey was being conducted by an organisation external to the military, may also have contributed to greater openness and 'admissions' of distress.
3. Data collected as part of the RtAPS process were, by the location and circumstance of data collection, explicitly linked to the particular deployment. In responding to the self-report questionnaire, this link was more tenuous and participants may have considered issues that caused them distress that occurred outside a military environment.
4. The Defence environment may have changed in recent times, for example, an increase in operational tempo may have had an impact on these measures.
5. Personnel may have deployed to other locations on operations and, either factors on the other deployments, or multiple deployments, may have had an effect.

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Capability

Proposal for an ADF Medical Imaging Network

Peter Duffy, John Magnussen, Graeme Shirtley, Nicole Dos Santos

The purpose of medical imaging is to provide a timely medical report on the state of a patient following appropriate technological examination to that patient's referring doctor to assist that doctor in his/her medical management of that patient.

Much existing ADF Medical Imaging equipment is obsolete and our systems require updating from their analogue origins to meet existing civilian Australian medical practice standards in place under Medicare based on digital technology. The ADF is expected to

provide medical services to its members at Medicare standards, at least in the NSA and as best as possible outside it.

This technology transfer can be achieved at modest cost in an evolutionary and staged manner with no anticipated disruption to existing practice across the three environmental services and is based on the expected upgrade of ADF x-ray facilities from "wet" film image capture and processing to Computed Radiography.

Equipment costs are less than ~AUD10,000 per x-ray site, including deployed / ship-board sites, plus the central PACS/RIS software (~AUD70,000) and a central archive computer and backup system (~AUD25, 000).

The proposed DOSD (Defence Online Services Domain) simplifies the security and IT issues that would be associated with the proposed Medical Imaging Network crossing the main Defence firewall between the secure Defence network environment and on-line radiologist consultants and other civilian medical officers caring for ADF members off base.

Completion of such an ADF Medical Imaging Network will provide an up to date platform containing members' medical imaging data and specialist reports of examinations performed in the NSA, on deployment, by our Coalition partners and in the public and private civilian sectors. Current externally performed MRI, CT and Ultrasound examination data and reports will be integrated into the relevant members' records. All reports and images will be available to authorised ADF medical officers on their desk, ward or theatre computers when connected to the Network.

The Network proposed is designed to allow expansion of the existing low level radiologic technology to include current and future equipment including CT, when such will be required on deployment by the incoming generation of military surgeons.

The teleradiology capability of the Network will provide a better patient service with less than 24 hour turnaround of specialist reports for "routine" examinations and on the phone "real time" consultation for urgent problems available to ADF medical officers both in the NSA and on deployment.

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Screening for mycobacterium tuberculosis infection in the military: Enhanced sensitivity and specificity using QuantiFERON-TB GOLD

Jim Rothel

Military personnel can be exposed to Mycobacterium tuberculosis (MTB), especially when serving in countries where TB is endemic. Testing has historically used the Mantoux tuberculin skin test (TST), which suffers from many performance and logistic limitations. These include poor specificity due to false-positive reactions in subjects BCG vaccinated or exposed to non-tuberculous mycobacteria (NTM), moderate sensitivity, the need to return after 2 to 3 days to have the test read, poor reproducibility, and subjectivity in placing and reading. In some military settings a pre-deployment test for TB that requires 2 to 3 days is incompatible with readiness status.

A further problem with the TST lies with its poor specificity leading to pseudo outbreaks of TB. Such a situation was recently reported for the US Army with false-positive TSTs generally due to variability in reading and administration, differences in tuberculins used, and cross reactivity to NTMs.

The rate of active TB in personnel from military of developed countries is generally low, but the close living conditions often encountered mean that control of MTB infection is important. This is demonstrated via a recent publication of a TB outbreak in a Swiss training camp, where nearly all recruits sharing a dormitory with the index case were infected, along with a number of others exposed. Moreover, due to low prevalence of MTB infection in most military populations and poor specificity of the TST, most people who are found TST positive are likely not infected but still may be indicated for isoniazid prophylaxis, along with all its associated costs and risks of hepatic damage. All of the above factors make the TST a poor screening test for MTB infection.

In contrast, QuantiFERON®-TB Gold (QFT) is an objective, laboratory-based, blood test for MTB infection that is unaffected by BCG vaccination or NTM reactivity.³ A large body of clinical evidence demonstrates that QFT has a specificity of 99% and sensitivity for active TB of around 90%. QFT has been approved for use by many regulatory bodies worldwide, including the US FDA, and is recommended by the US CDC and the Armed Forces Epidemiological Board in all cases where the TST is currently used. QFT is presently being used for screening Military personnel in a number of countries including, the USA, United Kingdom, Netherlands, Switzerland, Germany, Korea, and the Slovak Republic. It is being used for contact investigations and for screening personnel pre-and post-deployment, civilian staff, healthcare workers, and those on active duty.

In conclusion, use of the QFT assay for MTB screening removes the inaccuracy, logistic problems, and subjectivity intrinsic with the TST. Being a far more specific and sensitive test for MTB infection, QFT results in better medical outcomes, significant cost savings, and treatment of those truly infected. The use of QFT in military settings worldwide will be presented, along with a summary of the test's clinical and economic performance relative to the TST.

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Teledermatology pilot study: Moving bytes not bodies

Robert Curtis, Anthony Hopcraft, Stephen Pullman

Building upon the Telemedicine concept articulated at the 2007 AMMA conference; the areas and environments in which ADF and allied forces have been deployed, are deployed and are likely to be deployed, are by their nature liable to cause a plethora of acute dermatological conditions and exacerbate chronic ones. Moreover, some localities to where members are posted are no exception to this.

Since March 2005, there has been no resident Dermatologist in Darwin to service the requirements of the Defence Area Health Service NT/K. This has been managed through the former Dermatologist conducting fly-in visiting clinics every six to eight weeks. This arrangement has met the basic clinical requirement; however the hiatus periods may potentially be prejudicial to more acute dermatological conditions or cause the deterioration of more benign complaints. This may require costly or potentially hazardous medical evacuations to tertiary-level health facilities; which would result in the loss of a potentially critical member to a unit and may impact on its operational capability. In this instance, the application of telemedicine may serve to overcome this inequitable access. Through the provision of teleconsultations with specialists, teledermatology shows promise to improve patient outcomes and reduce the effects of isolation.

Teledermatology as a specialty of telemedicine can be practiced in either via synchronous, i.e. video teleconferencing (VTC) or asynchronous (internet or e-mail) modalities. The former can be significantly more bandwidth intensive and costly than the latter. There is considerable literature as to the benefits and comparative clinical outcomes of teledermatology when compared to a face to face (F2F) dermatological consultation.

This paper describes the methodology implemented and results achieved during the pilot study. It tested the hypothesis that store-and-forward teledermatology will increase the accessibility of specialist health consultations to remote Australian military populations and reduce the time to a definitive diagnosis. It describes the clinical, business and technology outcomes and ideals that are required to develop and sustain a viable teledermatology network that could support the Commander, the remote clinician and the patient. The conclusion is that teledermatology is a viable telemedicine modality for the ADF in current activities and future operations.

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Developing a deployable molecular biology capability : the Lab-in-a-Box

Tim Inglis

The diagnostic capabilities of a military hospital focus on the needs of emergency medicine and comprise tests whose results have immediate relevance. Only a few microbiology tests meet these expectations, explaining why so little diagnostic microbiology is performed in field laboratories. Unfortunately, the small repertoire of microbiology tests provide inadequate support for medical officers working in the majority of overseas theatres. Conventional point-of-care diagnostic tests have limited application in austere environments where they lack the back-up of definitive diagnostic tests. Specialist units have therefore resorted to ruggedised molecular microbiology systems that package complex test processes and reagents in a form that can withstand operation in combat environments. Much of this equipment is available through restricted materiel acquisition pathways and thus cannot be developed in collaboration with the civilian laboratories that handle the bulk of human clinical samples.

In order to develop a deployable molecular microbiology capability we have brought together civilian and military, public sector hospital, university and industrial expertise and have concentrated its combined effort on field application of existing technology. This approach has minimised development cost and equipment stockpiling. The Lab-in-a-Box (LIAB), field portable molecular microbiology laboratory has gone through several iterations en route to a workable concept of laboratory operations. In its current form, LIAB comprises nucleic acid extraction, amplification (PCR), resolution and data interpretation stages. LIAB can be fully operational within 10 minutes of opening the trunk, and will produce its first set of specific, validated results in 3 hours from start-up.

We have commenced a preliminary raise-train-sustain cycle for LIAB and intend to audit this in order to refine the equipment and reagent manifest, standard operating procedures and the final packaging of the LIAB system. The applications we have scoped out include rapid diagnostic tests, disaster response, environmental health assessment, biological threat agent assessment (CBRN), outbreak investigation and forensic evaluation procedures. LIAB deployments so far include the East Kimberley, Central Sri Lanka and New South Wales. Emerging laboratory technologies are expected to further reduce the size of the current LIAB to desktop and handheld size. We need to grasp the significance of a future lab in your pocket.

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TABLE of blood group phenotypes of 203 Timor Leste battlegroup members compared with expected numbers from reference ADFP 710.

BLOOD GROUP PHENOTYPE	Rh (D) POSITIVE		Rh (D) NEGATIVE	
	% (actual)	% expected	% (actual)	% expected
AB	1.5 (3)	2.9	0.5 (1)	0.6
A	33.0 (67)	32.1	6.4 (13)	6.9
B	5.9 (12)	9.4	0.5 (1)	2.0
O	45.8 (93)	38.0	5.9 (12)	8.1

* Rh (D) frequencies are POSITIVE 82.5%, NEGATIVE 17.1%.

The emergency donor panel in East Timor: A survey of blood-group phenotypes and proposals for evolution of ADF Policy in theatres of operation
Edward Barin, Francis Ware, Richard Mallet

The utility of the Emergency Donor Panel (EDP) for the management of massive haemorrhage in a surgical facility without access to full blood banking facilities was established by a recent high profile case in East Timor.

Massive blood loss may be expected in combat trauma, but recent ADF operational experience suggests that conventional approaches to managing massive bleeding using haemostatic technology and stored blood may be inadequate. Effective resuscitation may be further compromised by limited supplies of blood, coagulopathy, or serious transfusion-related complications such as acidosis, hyperkalaemia and transfusion related lung injury which may occur with the use of stored blood components.

EDP or so-called "walking blood banks" (WBB) are among established strategies to deal with massive haemorrhage in forward medical units and remote communities. ADF policy on EDP and WBB continues to evolve.

On operations, non-battle injuries such as vehicle trauma also carry a risk of major blood loss. Patients with serious burns often respond better to fresh whole blood than to blood component replacement. Mass casualty scenarios in either civilian or military contexts also heighten the importance for urgent provision of large blood supplies.

Principles of "damage control" resuscitation in serious trauma often require the use of fresh blood to supplement the use of conventional blood component for early or definitive management. Furthermore, no surgery should be undertaken without assured supplies of blood.

We conclude -

1. A well designed EDP or WBB protocol (to support the use of conventional blood products) should be implemented in ADF operational health support plans as part of the usual Casualty Care Continuum.
2. The EDP should be integrated into a mass transfusion protocol, consistent with military medical doctrine of ADF coalition partners and civilian disaster management agencies.
3. The haemovigilance requirements for setting up an EDP are stringent but not onerous, but are within the capacity of a deployable pathology or transfusion team.

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Emergency blood donor panel – the difference between life and death

Glenn Keys, Annette Owtrim

ADF withdrew Emergency Donor Panel (EDP) 2 years ago, and has yet to replace the policy. Aspen, as provider of health services in SI and Timor, conducted a risk assessment and determined the need to gain approval for an EDP, in case of likely accidents, requiring emergency blood transfusions beyond the capacity of the Red Cross provisions (8 units of packed cells – 4 O pos, 4 O neg – a fortnight). We are only able to obtain packed cells from the Red Cross and therefore have no other blood products including clotting factors which are required in massive resuscitation. The use of whole blood provides the clotting factors without the necessity to use Fresh Frozen Plasma. Aspen developed a procedure for both SI and Timor, and sought approval from Defence Health for its use.

Then the presentation will outline key aspects of the approved procedure, including sign on protocols, database, tests, and enactment protocols. Benefits and risks of this EDP are then discussed, and then a case study of the use of the EDP; Ramos Horta. Outline timeline for Horta case, vital component of EDP in saving Horta's life.

Finally, outline suggestions for EDP into the future, both for Defence and Defence contractors.

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Did we get it right? The findings of the Hot Weather Ration Trial

Charina Kullen, Julia Carins, Ross Coad, Alison Fogarty

Introduction: As part of the Heat Injury Remediation (HIR) project, DOHS-A tasked DSTO to develop a Hot Weather Ration Pack (HWRP) that satisfies the nutritional requirements of soldiers in hot environments and leads to substantially increased nutrient intake relative to the existing Combat Ration One Man (CR1M). The reason for this request was to reduce the discard rate and hence reduce the risk of dehydration and nutrient deficiencies, and to improve physical and cognitive performance.

Methods: HWRP nutrient specifications were determined via a literature review. Qualitative data was obtained from 206 soldiers who took part in a ration acceptability survey that addressed likes and dislikes in the heat, and also requested suggestions on foods that should be included in a HWRP. Quantitative data was collected from 89 soldiers who were rationed with existing CRP during a field trial where all food discards were collected. The quantitative data was analysed using an in-house Excel food database (based on Aus Nut, Aus Foods and Foodworks) to estimate nutritional intake. The results of these two

studies were used to design and build the 3 prototype HWRP based on both current Ration items and commercially available products. The consumption rates and acceptability of the 3 HWRP prototypes were determined in a field trial during a training exercise in Northern Australia. Approximately 70 soldiers participated in a controlled trial employing a balanced crossover design. In addition to obtaining nutrient intake and food acceptability data, reasons for discarding foods were determined and changes in participants' body weight, hydration status and energy expenditure were recorded.

Results: The qualitative survey indicated that as a soldier's age and years of service increased so did the acceptability of the current ration pack. Soldiers indicated that they preferred main meals that do not require heating, more snack food items and fewer hot beverages. The responses also indicated that hunger and the acceptability of meals high in sodium and carbohydrate were reduced in the heat.

The quantitative study confirmed that soldiers discard a significant proportion of their CRP food, with some soldiers subsisting on less than 6,000 kJ/day.

The HWRP field trial confirmed that the soldiers participating were consistently operating in a state of mild dehydration and failing to meet their energy needs. However, the HWRP received an overall higher acceptability rating and led to significantly greater consumption rates than the current CR1M. Snack type foods and cold main meals were the most popular items.

Discussion/Conclusion: When soldiers were provided with a ration pack that considered soldier food preferences in a hot environment, nutrient intake was increased. The results of this trial provide Army with information that can contribute to the specification of a ration pack that more appropriately supports the required nutrient intake in hot climates.

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A Clinical Miscellany I

Hypoxia below 10,000ft – An under-appreciated risk for helicopter aircrew

Adrian Smith

Introduction: During routine aviation medicine training, rotary-wing aircrew are instructed that the impact of hypoxia on them from flying in unpressurized cabins up to 10 000 ft above mean sea level (AMSL) is relatively small and has few implications for aviation safety. Such reassurance is based on experiments conducted on resting subjects and may not reflect the true impact of hypoxia in aircrew engaged in operational tasks. This was explored in two coordinated studies. In Study 1, a survey listing common symptoms of hypoxia was distributed to Australian Army helicopter aircrew who had operated at altitudes up to 10 000 ft AMSL.

Results: Symptoms consistent with hypoxia were reported by 86.6% of non-pilot aircrew and 60.9% of pilots. 60% of non-pilot aircrew reported four or more symptoms, compared with only 17% of pilots. Commonly-reported symptoms included difficulty with calculations (45%), feeling light-headed (38%), slowed reaction time (38%), and confusion (36%). Loadmasters reported more symptoms (mean 5.4) than pilots (mean 2.2) ($p < 0.001$). Aircrew described operationally-significant symptoms as low as 6500 ft. Study 2 explored the impact of physical activity below 10 000 ft on the development of hypoxia. Six subjects exercised at 30 W and 60 W for four minutes at sea level, 2000 ft, 7000 ft, and 9000 ft. Oxygen saturation (SpO₂), psychomotor function, and symptoms were recorded at rest and during activity. SpO₂ decreased abruptly with physical activity; this was small at sea level (1%) and 2000 ft (2.2%), but substantial at 7000 ft (4.3%) and 9000 ft (5.5%) ($p < 0.001$). SpO₂ fell to 88.1% at 7000 ft and 85.7% at 9000 ft, returning to near-resting values within three minutes of stopping exercise. The number of subjects reporting symptoms of hypoxia, the number of symptoms reported, and the mean symptom score were all significantly higher during activity than rest at each altitude ($p < 0.001$). Response time during exercise for one subject was prolonged by 10-15% relative to rest, with a 25-30% improvement when breathing oxygen ($p < 0.05$).

Conclusion: Helicopter aircrew report symptoms consistent with hypoxia at altitudes much lower than they are taught, loadmasters more so than pilots. Physical activity below 10 000 ft can produce hypoxemia and symptoms of hypoxia, along with psychomotor impairment in susceptible individuals.

It may be inappropriate to emphasize during aviation medicine training the benign nature of altitudes below 10 000 ft for a non-resting population such as helicopter aircrew. Helicopter aircrew should be aware that physical activity as low as 7000 ft can produce hypoxemia and symptoms of hypoxia similar to that which would normally be expected in a person resting at approximately 12 000 – 15 000 ft.

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Mission command, risk management and high performance climates on peace keeping operations

Melissa Harries

Organisational climate can promote or inhibit individual and collective performance. Assessing organisational climate is increasing in appeal to Land Command COs as maintaining the human edge of capability with ever increasing operational tempo becomes critical. Climate analysis can be used not only to predict a unit's organisational effectiveness but also aids to identify at what levels interventions can improve capability by providing commanders with the information needed to manage the dimensions of climate. Whether or not a high performance climate exists is strongly dependent on leadership style (Jans and Frazer-Jans, 2002).

Leaders, by their action or inaction communicate norms and values to subordinates. Recent studies in both the military and civilian world have highlighted the contribution of middle and junior leadership to organisational effectiveness (Buckingham and Coffman, 1999, Jans and Frazer Jane, 2002). Leaders make their impact, in part, through the kind of performance culture they create. Developing a high performance climate in the Army will depend much on the management and leadership style of Pl Comds, Pl SGTs and Sect Comds.

A high performance climate in the ADF is characterised by four distinct features (Jans and Frazer-Jans 2002): Goal clarity and focus; empowerment to act; teamwork and cooperation; and an emphasis on innovation and "learning from doing". Good leaders have clear and well articulated vision, focus and support action, engender teamwork and encourage

people to be innovative and share their experiences. Personnel who work in high performance climates outperform those who don't (Jans and Frazer-Jans, 2002). How does the Army build high performance climates? Jans and Schmidtchen (2002) posit that the consistent application of the command philosophy of Mission Command is consistent with the elements of a high performance climate.

Mission Command requires leaders to clearly define intent, allocate tasks, provide resources and define constraints on actions. Mutual trust and respect between commanders at all levels is paramount and consequently an acceptance of risk is required. The utilisation of Mission Command should therefore produce outcomes consistent with high performance climates such as: 1. increased individual performance; 2. greater collective performance (a high performance climate); and 3. positive impacts on mental health. The author will present her findings on the relationship between Mission Command and individual performance, performance climate and mental health of personnel currently deployed on OP ASTUTE.

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Predicting the unscheduled dental visit for the Australian Defence Force
Greg Mahoney, Gray Slade

Background: The Defence Dental Service has used the Denclas classification for dental fitness since the early 1970s. This system classifies members into 4 categories; dentally fit with no dental problems; dentally fit with dental problems that are unlikely cause problems in the next 12 months; dentally unfit requiring treatment; and dentally unfit requiring immediate treatment. While this classification system has been useful tool for dental triage, it has not been predictive of whether a member likely to become a dental casualty in the next 12 months.

Aim: To determine whether a better dental classification system be designed that will reflect Australian Defence Force members' risk of being a dental casualty by identifying additional markers that are easy to collect and that are predictive.

Methods: A prospective cohort study was conducted on 875 deployable Australian Defence Force (ADF) personnel between the ages of 17-56. Participants were enrolled in the study during their Annual Dental

Examination (ADE) in 2006 and a questionnaire was completed which included demographic, lifestyle, dental history and clinical information. At this point data was also recorded on whether they had had an Unscheduled Dental Visit (UDV) in the previous 12 months. In 2007, during participants' next ADE, data was again recorded on their UDV history. Variables that were associated with increased risk of UDV were then entered into a multivariable logistic regression for analysis.

Results: A classification system based on risk of being a dental casualty yielded significantly improved sensitivity and specificity over the present Denclas system with area under the receiver operating curve of 0.76 compared to 0.59. The final model contains a variety variables which are derived from participants' demographic, lifestyle, dental history and clinical information.

Conclusion: A dental classification system based on a member's risk of becoming a dental casualty is possible. This research is supported by: Centre for Military and Veterans' Health, Department of Defence and the Australian Dental Research Foundation.

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Ischaemic heart disease risk factors in the ADF: An occupational medicine perspective
Neil Westphalen

At present there is no formal ADF process for screening medical fitness to deploy with respect to cardiac risk. Although some members may be deploying who are at high risk, it is far more likely that other members are prevented from deploying who may in fact be medically fit

Considerable effort has been expended on civilian medical standards for safety-critical occupations, most recently civilian rail workers and NSW harbour pilots (both based on those used in the civil aviation industry). These use a point score based on the American Heart Association's (AHA) Coronary Disease Risk Factor Prediction Chart.

The aviation and rail industries use 15 points (5% risk at five years, and 10% risk at ten) as the action cut-off. However, the main consideration for both industries is preventing sudden incapacitation, rather than assessing their ability to deploy. This mitigates against the ADF using 15 points because the deployment cut-off would be too low.

Recommend the following:

- The AHA Chart be used as the standard cardiac risk screening tool for ADF members, as part of the CPHE every five years, or as clinically indicated.
- A point score of 18 be used as the action point score for stress ECG and cardiology review, such that:
- Members without active disease and a points score of less than 18 on treatment are MEC 2 to facilitate monitoring, the periodicity of which is subject to cardiologist advice.
- Members with active disease, or have a point score of 18 or more are MEC 3 pending treatment. Members who are considered MEC 2 on clinical grounds despite a points score exceeding 18 or more should be confirmed by the MECRB.

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Peri-operative audit in the ADF: Initial
experience from AUSMTF-1, Afghanistan

S Neuhaus, B Londregan, R Mallet

Background: Perioperative audit and peer review is a normal part of surgical practice and forms an important component of the clinical governance framework surrounding (Level 3) surgical management of casualties in the ADF. ADF Surg Assist is a peri-operative clinical audit tool designed to provide structured collection of peri-operative data. This data is used to facilitate improvements in surgical and anaesthetic care provided on ADF operations. The tool was trialled during the recent deployment of an ADF surgical team (AUSMTF-1) to Afghanistan as part of the Role 2 (level 3) Dutch health facility in Tarin Kowt.

Scope: This paper will address the nature of surgery undertaken during the AUSMTF-1 deployment and recommendations for ongoing improvement of the ADF Surg Assist tool and perioperative audit processes.

AUSMTF-1 personnel performed 67 surgical procedures on 45 casualties during the deployment. 60 patients underwent general anaesthesia. A minority of patients were ISAF personnel with the major casualty group undergoing surgery being Afghani children (28%). The most common procedure performed was wound debridement.

ADF Surg Assist effectively enabled capture of

verifiable demographic and treatment data for all patients undergoing surgery by the AUSMTF-1 team. A number of recommendations were made including:

1. Incorporation of anaesthetic data;
2. Expansion of performance indicators;
3. Data capture of disposable/expense surgical items.

Use of ADF Surg Assist on future rotations to Afghanistan will provide a robust dataset and enable assessment of outcome data (morbidity and mortality) and benchmarking against Australian National Standards.

Conclusions: The recent deployment of ADF Surg Assist on AUSMTF-1 is the first time that verifiable peri-operative data has been obtained during an Australian deployment involving Role 2 (level 3) surgical capability. This represents an important commitment of the ADF to ongoing improvement in the clinical care provided to Australian servicemen and women undergoing surgery on overseas operations. Further, it provides an opportunity to review this valuable data and to close the audit loop by providing clinical 'lessons learned' back to the ADF and the wider surgical and anaesthetic community.

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Mobile field regimental aid post

Andrew Gordon

Any military medical service should be set up and ready for handling of casualties within minutes of stopping at any location. I modified an 8 foot x 4 foot box trailer (2.44 m x 1.22 m) so as to accommodate a standard NATO stretcher, 7 foot 6 inches (2.3 m) and ensure that all of the RAP equipment is well protected from the elements yet readily accessible soon after stopping.

This trailer carries vertical support poles, horizontal ridge poles, a 14 x 14 tent plus CES. The medical stores are in bin pack boxes. The master working side is the left hand side, passenger side of the trailer based on Australian road conditions.

The boxes on the other side of the trailer carry more stores, administration stores, patient comfort stores and still more medical stores.

The lids of the bin pack boxes fold down horizontally so that they are at a comfortable working height.

Lists of standard treatment protocols e.g. mg / kg of drug quantities are under protected covers on the inner side of the lids. All the medical stores are documented in lists which could be re-worked into a data base; contents of each box, the location of each item.

On the front triangle of the trailer, larger and more awkward items are carried e.g. chairs, stretcher supports, generator, steriliser. The tarpaulin 6 m x 4 m provides protection from the sun and rain and the airflow. The trailer can be parked in or beside a 14 x 14 tent.

The packing up time is short and much better than packing onto the back of a truck.

The ergonomics are correct because all of the items of equipment are such that they can be handled by an average sized soldier or average strength.

A battery is carried so that the trailer has independent lighting independent of the towing vehicle.

The trailer is self sufficient as is the RAP in terms of initial water supply and initial reserve fuel supply.

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Obesity management in the RAN: An occupational medicine perspective Neil Westphalen

Health Directive 206 notes that obesity is an important risk factor for cardiovascular conditions. However, notwithstanding its importance as a public health concern it is first and foremost a health promotion issue that cannot be managed as a medical problem in isolation from other influences. From an occupational medical perspective, health promotion issues therefore should not preclude ADF members from deploying on medical grounds.

In FY 06-07 FBWHC performed 630 MECs on a population base of 2500 (both at sea and ashore). Of

these 10.1% were for obesity per HD 206, half of whom were MEC 301, of who about a third were offered a waiver. However, discussions with FBWHC MOs suggest that the total number of obesity cases could be underestimated by an order of three, which would equate to about 7.7% of PNF members.

HD 242 on the ADF Health Promotion Program notes the various criteria to be met for health screening, however the manner in which BMI is used for obesity does not comply. It is argued HD 206 does not comply with the Disability Discrimination Act unless it can be demonstrated that there is a specific ergonomic or related problem from their weight that precludes them from performing an inherent requirement of their job - and this is not a medical responsibility Workplace health promotion programs are an integral part of any occupational health system. However they are distinct from other responsibilities with respect to workplace occupational health and safety. Encouraging healthy lifestyles is laudable, however ADF obesity management should not be a higher priority than other workplace health issues. Workforces are not randomly-selected captive audiences to whom community health promotion programs can be simply applied. It is economically reasonable and beneficial to the general community to reduce health risks, however any long term health investment should not occur at the expense of the immediate ability of employees to perform their normal duties (or in the ADF's case, affect their deployability). Weight status should therefore be de-linked from fitness-to-deploy, unless:

- The member has complications from their obesity that directly impacts on their ability to deploy. Such cases should be managed on their clinical merits by health staff.
- The member has ergonomic or other non-medical problems related to their size that precludes them from performing their job at sea. Such cases should be managed by divisional staff.

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The Millennium Cohort

Understanding the long-term health challenges of military service: the US Millennium Cohort Study

Tyler Smith

Background/Objectives: Many health questions were unable to be answered after the 1991 Gulf War due to limitations of retrospective and cross-sectional study designs. The U.S. Millennium Cohort Study was designed in the late 1990s in response to U.S. Department of Defense, Congressional, and Institute of Medicine recommendations for coordinated prospective research to determine how military occupational exposures, including deployment-related exposures, affect long-term health. Soon after the launch of the Millennium Cohort Study in 2001, wars in Afghanistan and Iraq began. From the onset of the wars, U.S. and coalition service members have been exposed to intense and prolonged physical and psychological stressors that may have profound impact on the health and functioning of deployers, and may create public health challenges in a large population beyond their time in military service. The Millennium Cohort Study is prospectively answering mental and physical health concerns and will continue to follow this large cohort of active duty, Reserve, and National Guard during and after their service.

Methods: In collaboration with all U.S. military service branches and the U.S. Department of Veterans Affairs, the Millennium Cohort Study was launched in July 2001 to follow the health of more than 150,000 active duty, Reserve, and National Guard service members through 2022. The Cohort consists of a stratified random sample of US military personnel surveyed every 3 years until the year 2022. The questionnaires collect self-reported data on demographic information, medical conditions, symptoms, occupations and exposures, and contain validated instruments to assess physical and mental health, including posttraumatic stress disorder (PTSD) and depression. Questionnaire data are linked with electronic deployment, hospitalization, ambulatory, mortality, pharmaceutical, vaccination, reproductive, and exposure data.

Results: Approximately 77,000 service members enrolled in the first panel of the Millennium Cohort (July 2001 to June 2003), and more than 55,000 participants provided complete prospective data at the first follow-up (June 2004 to February 2006). Additionally, more than 31,000 service members

enrolled and completed a baseline questionnaire in 2004-2006. The current enrollment/follow-up cycle (May 2007 to August 2008) has enrolled more than 40,000 additional cohort members and obtained follow-up questionnaire data on over 70% of the Cohort who submitted baseline questionnaires in 2001-2003 or 2004-2006. Nearly 40% of this Cohort had operational deployment experience during this time. Detailed multivariable analyses have revealed that: (a) the baseline prevalence of mental health challenges in the Cohort compares favorably with other military and civilian populations, (b) deployment, per se, does not increase the risk for mental health disorders such as posttraumatic stress disorder (PTSD), but combat-like exposures greatly increase such risk in deployers.

Conclusions: The Millennium Cohort Study is providing new and valuable insights about the mental health implications of military service, as only a prospective epidemiologic study of this magnitude can provide. The Cohort has defined mental and physical health and behavioural changes in temporal association to military deployment in a large population-based setting. Future follow-up of these cohort members will continue to shed light on new-onset, resolution, and recurrence of symptoms and illnesses that may be associated with military service over time.

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A longitudinal investigation of the mental health of military caregivers before and after deployment in support of the wars in Iraq and Afghanistan

Isabel Jacobson, Cynthia LeardMann, Edward Boyko, Timothy Wells, Margaret Ryan, Besa Smith and Tyler Smith

Background: The association between posttraumatic stress disorder (PTSD) and exposure to trauma among healthcare workers has been documented in both civilian and military populations. To date, only limited cross sectional studies have been conducted to assess PTSD or depression among caregivers deployed in support of the current wars in Iraq and Afghanistan.

Methods: The Millennium Cohort Study was designed to prospectively evaluate the long-term effects of military service on health over a period of 21 years. The study was launched in July of 2001, and 77,047 participants were enrolled by June of 2003. From June 2004 to February 2006, 55,021 (71.4%) of these participants were followed up. The Millennium Cohort Study collected data containing information on military occupation, depression, PTSD, and trauma exposure. Additionally, deployment dates were available from electronic military data. The outcomes for this study were new-onset of symptoms of PTSD or depression. The population was stratified by deployment status into three groups as follows: those who deployed and self-reported combat exposures, those who deployed and did not self-report combat exposures, and those who did not deploy. Within each stratum, logistic regression modelling will be used to examine the likelihood that caregivers will develop symptoms of PTSD or depression compared to individuals in all other occupations.

Results: Of the 55,000 Millennium Cohort participants with longitudinal data, approximately 25% have deployed in support of the wars in Iraq and Afghanistan, and approximately 12% are military caregivers. In addition, about half of those who deployed were exposed to combat or trauma. The estimated prevalence of PTSD and depression among follow-up participants is 5% and 9% respectively. Analyses are ongoing.

Conclusions: Quantifying the risk of PTSD and depression is critical to understanding the scope of these mental health problems among those providing care. These results may offer evidence that specialized training to cope with trauma may be necessary for caregivers who are sent to combat areas. Continued prospective analyses of this population will lead to better understanding of the course of these disorders and the long-term impact of military deployment on these important health outcomes.

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Anthrax and smallpox vaccination in the Millennium Cohort: Validation and measures of health

Cynthia LeardMann, Besa Smith, Tyler Smith, Timothy Wells, Robert Reed and Margaret Ryan

Background: Concerns about adverse health effects from anthrax and smallpox vaccinations have prompted many studies. Self-reported vaccination data are commonly used in epidemiologic research and may be used to determine vaccination status during a bioterrorist attack. While important to measure agreement between reported information and other sources when possible, the reliability of self-reported smallpox and anthrax vaccination data has not been established.

Objectives: To compare self-report and electronic records for smallpox and anthrax vaccination and to examine variation in vaccination agreement as it pertains to subjective and objective health measures.

Methods: Data from the Millennium Cohort Study, a large prospective study launched in 2001 to evaluate risk factors related to service in the United States' military, were used in this study. For each vaccine, concordance status was separated into four categories based on the agreement between self-reported and electronic vaccination records. Descriptive measures and kappa statistics were used to compare self-reported anthrax and smallpox vaccination with electronic vaccination records for over 50,000 participants of the Millennium Cohort Study. Multivariable modelling adjusting for potential confounders was used to investigate vaccination agreement status and health metrics, as measured by the 36-item Short Form Health Survey for Veterans (SF-36V) and hospitalization data.

Results: Excellent ($\kappa=0.80$) and substantial agreement ($\kappa=0.62$) was found between self-report and electronic recording of anthrax and smallpox vaccination, respectively. For both vaccines, there were no differences in hospitalization experience by vaccination status. However, those who self-reported anthrax vaccination but had no electronic confirmation had consistently lower measures of functional health, as measured by the SF-36V. Lower measures of subjective health were also found for three of the eight self-reported functional health scales among participants who reported receiving a smallpox vaccination without electronic confirmation.

Conclusions: These results indicate strong reliability in self-reported anthrax and smallpox vaccination and that vaccination is not associated with measurable decrements of health among Cohort participants. While overall scores of the SF-36V scales suggested a healthy population, participants who self-reported vaccination with no electronic documentation reported lower measures of health and may have health challenges that deserve further research.

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Training I

The accuracy of hypoxia awareness training in military aircrew

Dr Adrian Smith

Introduction: A person's manifestations of acute hypoxia are unique and not believed to change dramatically over time. Previous studies have found that significant proportions of aircrew who experienced hypoxia-related incidents were able to recognize their 'hypoxia signature' because of similarity to symptoms they experienced during hypoxia awareness training. This study aimed to explore the degree of similarity between the symptoms experienced during acute hypoxia and those remembered from previous hypoxia awareness training.

Methods: A questionnaire listing 22 symptoms of hypoxia was distributed to aircrew during aviation physiology training - at the beginning of the hypoxia lecture and again after hypoxia awareness training.

Results: Cognitive and psychomotor impairment dominated the symptoms reported after acute hypoxia as well as the symptoms remembered from previous training. Aircrew reported a mean of 16 hypoxia symptoms on both surveys. 65% of aircrew experienced during acute hypoxia the five symptoms they remembered to be dominant from previous training; 57% of aircrew remembered from previous training the symptoms that dominated their experience of acute hypoxia.

Conclusions: The level of agreement between the symptoms aircrew describe after acute hypoxia and the symptoms they remember several years later suggests that hypoxia awareness training is an effective method of enabling aircrew to recognise their 'hypoxia signature'.

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Meeting the challenges of training the military surgeon

Andrew Davidson, Michael Morgan

The importance of the military surgeon cannot be overestimated. However, with the increasing trend towards subspecialisation amongst surgeons, the complex skill set required of a military surgeon simply cannot be provided during traditional specialist surgical training.

Currently, limited opportunities exist for additional skill training for military surgeons. The Early Management of Severe Trauma (EMST) and Definitive Surgical Trauma Course (DSTC) are excellent short courses designed to introduce the military surgeon to the principles of trauma surgery. However, a more thorough and detailed exposure to the complexities of trauma craniotomy, thoracotomy, vascular control, surgical airway management, and damage control surgery cannot be covered in great detail without intensive immersion in a surgical environment.

Although experienced ADF surgeons may have civilian or operational experience in these aspects of military surgery, and continue to perform admirably in a variety of operational and humanitarian deployments, the limited exposure of the newer generation of surgeons to this specific set of military surgical competencies requires a unique solution.

The Australian School of Advanced Medicine (ASAM) at Macquarie University has changed the face of medical training in Australia, by bringing together a group of world-class researchers, clinicians, and educators to create an innovative competency-based training program with a focus on future trends in medicine. The school offers post-fellowship sub-specialty training for doctors, with a range of higher degrees available.

ASAM is currently developing a Master of Advanced Surgery program in Military and Remote Surgery, which could potentially be undertaken by FRACS-qualified surgeons seeking a qualification that signals mastery of additional skills and competencies in military surgery. The program would include modules in ethical surgical practice, teaching and research, and a detailed set of surgical competencies tailored specifically to the needs of the military surgeon.

Over the course of the next 12 months a state of the art academic, research, and clinical facility will be completed at Macquarie University, incorporating the Macquarie University Private Hospital and Macquarie University Clinic (including the Centre for the Advancement of Medical Education). Facilities will include a cadaveric

anatomy laboratory, and a modern clinical skills and simulation centre.

The solution to meeting the challenges of training the military surgeon may lie in a potential collaboration between the ADF and the Australian School of Advanced Medicine at Macquarie University.

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Simulation in pre-deployment activities for Australian military medical teams

Susan Neuhaus, Richard Mallet

Background: Over recent years there has been an explosion of interest in the benefits of simulation in health care. It is increasingly recognised that simulation can replace the reality of some aspects of traditional clinical education and training. Military Medicine in all countries faces similar challenges; to train medical personnel in peace for the realities of war. This is particularly relevant to the Australian Defence Force (ADF) where the ability to train for battlefield trauma or austere military settings is limited by the nature of Australian civilian trauma.

Scope: In early 2008, an Australian Army medical team (AUSMTF-1) deployed to provide surgical and intensive care services to NATO-led International Security and Assistance Force (ISAF), US-led Operation Enduring Freedom (OEF). AUSMTF-1 was the first ADF mission to successfully integrate into a NATO Role 2 military hospital. Lessons learnt from previous ADF medical commitments in Balad – Iraq, contributed to this success. AUSMTF-1 comprised regular and reserve personnel drawn from the 1st and 3rd Health Support Battalions of the 17th Combat Service Support Brigade.

The success of health missions mounted by the ADF are contingent upon optimising the dynamics of diverse teams of specialists drawn from medical units based all over Australia. Pre-deployment activities for the mission to Oruzgan Province, Afghanistan were focused, therefore, upon integrating the collective medical and military experience of all team members. These activities included the conduct of simulation training within the Sydney Medical Simulation Centre based at the Royal North Shore Hospital (RNSH). Additionally, further simulation training was conducted in a US Medical Simulation Training Center (MSTC) en-route to Afghanistan. All AUSMTF-1 personnel were exposed

to training simulations and scenarios allowing them to practice triage, resuscitation, team-building and damage control surgery principles. All training was orientated toward the management of complex trauma and battle casualties.

Use of sophisticated medical simulation training is not new to the ADF. What has changed, is the environment within which Australian military medical teams are required to provide combat health support. Australian medical personnel must be provided appropriate training and pre-deployment preparation. The technology within RNSH and MSTC allowed the use of life-sized human patient simulators. During medical simulation a range of physical and physiological parameters were continuously modulated in response to interventions made by AUSMTF-1 personnel reacting to operationally relevant clinical scenarios. The use of video recordings and scenario debriefs provided excellent feedback and cemented the clinical learning experience.

Conclusions: Medical simulation training continues to demonstrate tremendous potential as a tool for future education and realistic pre-deployment training of Australian military medical personnel.

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Getting the BASICs of critical care right - A model for military medical education

Anthony Holley, Robert Boots, Ross Freebairn, Jeff Lipman

Basic assessment and support in intensive care (BASIC) is an international critical care course which was originally developed in 2003 by Fellows of the Joint Faculty of Intensive Care Medicine, Australasia, at The Chinese University of Hong Kong. The vision in developing the course was to provide an educational package for those commencing a career in critical care, as well as non intensivists who may intermittently be called upon to care for the critically ill. The course is unique in that it is available to both doctors and nurses. This presentation will provide insight into the course and consider the educational strategies employed to enhance the learning experience. More than 25 courses have been conducted across Australasia, Hong Kong, South Africa and the course has also been taught in a number of developing countries including Cambodia, India and Indonesia. A pilot course was conducted at 2 Health Support Battalion, Enoggera in September of 2007 and was attended by 24 ADF personal, representing all three services. More

significantly health professionals from varied disciplines including medical assistants, nurses and medical officers attended. The instructor faculty was almost entirely drawn from current serving medical specialists from all three services. The results of courses will be considered, together with candidate evaluations and the applicability of the course to the military environment reviewed. Every major recent Australian Defence Force Health Service deployment has included a critical care facility. This course delivered over three days, is standardised, may effectively be repeated for deploying personal and hence potentially could constitute a formal training module, not dissimilar to the Early Management of Severe Trauma (EMST).

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The ADF EMST course:
regrouping and moving forward

Andrew Ellis, Bruce Waxman

The Early Management of Severe Trauma programme of the Royal Australian College of Surgeons (as the American College of Surgeons Advanced Trauma Life Support

Programme is known in Australia) has been a standard course for ADF Medical Officers since 2000. The RACS EMST course is augmented for ADF MO by the addition of a military module.³⁸ ADF Courses have been taught since that time without significant change.

It is timely to review the nature of this course and to reflect on course content, structure and learning objectives with respect to ADF goals. The fundamental question is how best to provide ADF MO with a skill set to manage major trauma especially in the context of military wounding.

In this paper the course structure and content is reviewed along with an analysis of the methods used by other nations.

A course in which military learning goals are met by the addition of small elements of integrated learning are worked in with the EMST course and then additional material specific to military wounding is introduced is suggested. A mechanism for introducing the learning goals concerning penetrating injury, blast and explosive devices, the role of contemporary pre-hospital Tactical Combat Casualty Care and evacuation is suggested. Importantly this could be achieved without altering the complete EMST "message" or qualification.

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Health Practice and Governance

See no evil, hear no evil, speak no evil: the military health system learning lessons from the civilian sector?

Dr Isaac Seidl

Australia's military health system has a constant dependency of around 55,000 full time Defence personnel. They come from a generally younger, fitter background than the general Australian population. But that doesn't mean they require a lesser standard of health care. Indeed, the per capita spend on health in the ADF is greater than for the general population, because of a grand strategic requirement for military preparedness, of which a component is health readiness.

Importantly, the military health system should not rely on the physiological 'youthfulness' of its dependency as a risk mitigation strategy. It should be dynamic, and seek to eliminate unnecessary waste whilst maximising health value-add ('lean thinking' methodology). Most importantly, it must be contemporary. In order to be so, it must meet the needs of its patients, and of society.

This presentation highlights a few vignettes of where civilian clinical governance has become more modern – areas that Defence ought to pick up on for the betterment of health outcomes. These vignettes will cover health incident reporting, continuous improvement of policy and open disclosure. Further the use of the Joint Military Appreciation Process (JMAP) in order to improve strategic outcomes in both military and civilian practice, will be discussed.

None of these considerations could be introduced overnight. This presentation seeks to challenge today's strategic health planners to consider how to best prioritise the limited resources available, the end state being the best outcomes for patients and professionals (let's not forget the staff). If those limited resources are so restricted as to prevent safe patient outcomes, then leadership will be required to win additional resources.

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Adding quality, does it really change anything?

Frances Le Pavoux

AHS ACT/SNSW has been providing health support to permanent ADF members, entitled reservists, entitled foreign military members, entitled cadets and entitled civilians for many years. The AHS has previously been accredited with ISO so the process of accreditation is not really news within Defence Health. The decision to begin accreditation with the Australian Council on Healthcare Standards has resulted in a process which gives clear direction which we, as an organisation, can benefit from and incorporate into our strategic business plan and unit business plans so that its influence actually improves the quality of care that members receive when accessing Defence healthcare. Additionally, as an ACHS accredited organisation, the profile of working within AHS ACT/SNSW is more appealing to clinicians concerned with their professional profiles and career progression.

Quality is usually a term that makes clinicians eyes glaze over. Images of ticking boxes and filing audits in dusty folders on back shelves abound. Fortunately, the ACT/SNSW Area Health Service Executive are better informed and are embracing the accreditation process through the Australian Council on Healthcare Standards. Whilst many were very hesitant at the start, once the process began, staff were patting themselves on the back because it really highlighted the many areas where they were performing well and identified clearly the areas where they required improvement. This information provided the quality plan for the next 12 months.

Change is never easy in any organisation. This paper will highlight the process over the past year and the hills that we will be climbing with a collaborative approach in the future to ensure that ADF members in the ACT/SNSW area receive quality healthcare that is accredited nationally and based on best practice principles.

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Reducing adverse events in primary healthcare utilising limited resources

Jill Hughes, Megan Malone

Area Health Services ACT/SNSW has been providing health support to ADF members, entitled reservists, entitled foreign military members, entitled cadets and entitled civilians for many years. Within the AHS, Russell Health Centre is located beside the Russell Offices Complex and supports an extremely broad demographic due to the seniority of the personnel working within the Russell and Campbell Park Offices precinct. It provides a primary healthcare service, dental service and referrals to specialists.

It was identified there was an urgent need to review current processes to ensure ongoing delivery of quality health care services to ADF members utilising current resources. A quality improvement project was initiated to review processes in two high risk areas and these were:

1. There were delays in timely review of medical test results sent into the Administration area of the Russell Health Centre. Current staffing levels did not allow for timely review of medical test results for ADF members.

2. There were delays for ADF members accessing ongoing medical reviews in a timely manner. ADF members were utilising "Sick Parade" appointments to access medical officers.

A Registered Nurse role was implemented to triage during sick parade and monitor medical test results sent to the administration area. Processes were established where members were recalled for medical reviews after test results were evaluated in a timely manner. Current evidence indicates that this has had a positive influence on the efficient use of medical officers' hours and a reduction in actual and potential adverse events.

This paper will outline the depth of the problems identified, strategies implemented, statistics supporting the success of the role and evidence of continued improvement.

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Ethical practice in a military medical environment

Emma-Jayne Grigson

Ethical standards affect all areas of the Health profession, including those that are inherent in the codes of medical behaviour and those that are generally accepted by the community at large, as normal. Within the civilian sector, most of these ethical issues are clear-cut; with no room or exceptions or negotiation. However, within the military Health sector there can appear grey areas. Confidentiality, for example, is a difficult issue, as often commanders have a duty of care that can outweigh certain confidentiality issues – especially when dealing with self-harm or potential dangerous-to-others behaviours. Therefore, for military Health professionals, maintaining these standards of ethical behaviour involves more than their civilian counterparts and they must ensure that their clients are aware that the assumptions they make of civilian practitioners, may not necessarily apply – that there may be overriding military regulations in place.

The management of this issue should not be borne alone by the GSOs within Army – as they do not hold the expertise in medical science in order to make ethical and unbiased judgements. The GSOs are not medically trained, they have only been through strict regulated military training; and therefore may inadvertently make judgements based upon that experience – which will be unethical and biased. As suggested by the Naval Reserves Studies program (2006), uniformed practitioners (SSOs) must be given the latitude to educate their military commanders in medical ethics. The issue of ethics and its ability to influence a new SSO structure must result in the SSOs taking ownership of the ethics and instilling those inherent codes onto all military Health practices as applicable.

Conversely, GSOs must be aware of the ethical codes and restrictions of SSOs as it will impact the employability of and use of SSOs in certain areas. Geneva conventions regulate the use of military Health professionals in non-Health positions; and adherence to these regulations is paramount to ensuring the right decisions are made. GSOs and the governing bodies whom place SSOs, must include a process of 'ethical screening' of the structure –enabling ethics to be implemented in a fashion which upholds the integrity of the Military and its members.

A suggestion is that elements be taken from different ethical code approaches, and that these be combined to

produce an equal and fair code for all. This suggestion is pivotal for Defence, where different ethical codes may need to be combined in order to reach the desired state. In order to construct an overarching code within the caring professions, a discursive approach could be best for Defence, because it would be responsive to the differing viewpoints and values between GSOs, SSOs, commanders and patients.

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Futures in military and veterans' health services delivery

N Ellis, J Palmer

This paper will describe alternative futures for military and veterans' health service delivery. Backcasting from the different visions for 2020, which have been derived using a structured futures studies methodology, will have generated a series of recommendations for action in research and professional development which must be taken now, to achieve a desired future and avoid undesired futures. The recommendations for research and education will be presented. A feature of the presentation, if extra time is permitted, will be a video illustrating the difference in experiences of a military family consisting of: a grandfather (Vietnam Veteran); a son (Gulf War Veteran); and a granddaughter (leaving the services in 2020), in dealing with health issues.

This work is the culmination of a ten-month program which has had high level engagement from both the Department of Defence and the Department of Veterans' Affairs, and has attracted considerable international interest.

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Ethics

Te Genero – Consequences of Flawed Study Design

Graeme Shirtley, Graeme Cannell, John Morrison

In 2005, Te Genero, a small German biotechnology company conducted a “first-into-man” clinical trial of a monoclonal antibody in volunteers. The monoclonal antibody had been developed with specificity for the CD28 T Cell surface receptor and the product was proposed as a stimulator of the immune response, with potential application in immunocompromised individuals. The activation of T lymphocytes, the key regulators of the immune response, was the desired outcome with the recipient having an enhanced resistance to infection until normal immune function could potentially be restored. Te Genero determined to conduct the study at a dedicated facility in Northwick Park, London. Approvals were sought from the British regulatory authorities and the applicable Independent Ethics Committee.

Eight volunteer subjects, all of whom had been paid some \$2500 (as is normal in such studies) participated in the study. Two subjects received placebo while six received the antibody. All subjects receiving the antibody developed serious adverse effects – including organ failure, respiratory distress and disseminated intravascular coagulation. In the five years since dosing, a number of the subjects continue to show adverse effects and are unable to study or work.

In a properly designed study, the goal of the sponsor and the researchers is to develop a therapeutic intervention that demonstrates both safety and efficacy, such that it satisfies regulatory authorities and can potentially be developed commercially. Evaluation of such potential studies should include issues such as –

- Safety
- Efficacy
- Dose
- Side effects (adverse effects)
- Merits of the Scientific Study Design

The Te Genero incident demonstrated a number of failures in the system of review, approval, and conduct of human research i) by the sponsor of the research, ii) by the regulatory authority, iii) by the ethics committee, and iv) by the investigators. This presentation reviews the scientific, ethical, and communication flaws demonstrated in this trial and the grave consequences that may occur – even in circumstances that represent “state of the art”.

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Whistle blowing - It takes more than courage

Graeme Shirtley, Graeme Cannell, John Morrison

Woman: Well hang on, there was the brick through the window.

Man 2: He was lucky it was just a brick.

Woman: And the death threats to his family.

Man 1: Ah, you don't know where they came from. How do you know he didn't make them up?

Sharon Carleton: Excuse me, Sharon Carleton, Radio National, The Science Show. I was just wondering, who you're talking about? He must have done something awful or he must have committed a pretty big fraud to deserve all this. What did he do?

Man 2: He didn't commit the fraud, he exposed it.

Dr Nancy Oliveri was a Canadian doctor, employed by the University of Toronto, who conducted a research project using the oral form of desferrioxamine to lower build-up of iron in transfused patients. The sponsor for the trial was Apotex and the study was conducted in the Hospital for Sick Children in Toronto. After some years Dr Oliveri detected that the drug was losing its effectiveness and informed her patients. She later connected the drug to liver toxicity, which she duly reported to the institutional Ethics Committee. Dr Oliveri was accused of breaching a Confidentiality Agreement and was subjected to sackings, reinstatements, inquiries, hate-mail and libel suits.

The scenario has parallels in Australia where individuals have exposed the deceit and fraudulent conduct of researchers. Accusations of fraud have been leveled at Dr William McBride of Foundation 41, and also at Prof Bruce Hall from the University of New South Wales. The causes or motivation that results in research or scientific fraud are many. However, common threads are conflict of interest, ego, publications, grants, and perhaps to a lesser extent financial gain in the form of funding or personal reward.

This presentation will consider the ethical issues raised by scientific misconduct and fraud, including –

- Effect on whistleblowers
- Causes of misconduct
- Responsibilities of ethics committees
- Australian guidelines and legislation
- Responsibilities of institutions and companies
- Ethics issues related to fraud

These issues will be discussed in a Defence context.

“Given my experience I would say I would never, ever do it again even though I firmly believe I'm doing the right thing”

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Ethical Dilemmas in Human Research

Graeme Shirtley, Graeme Cannell, John Morrison

The range of ethical issues confronting individuals involved in human-based research projects has increased significantly over the last decade. This has resulted from a number of factors – such as the increased complexity of projects, development of more complex scientific techniques, broader nature of projects, financial and funding pressures, conflicts of interest, scientific validity, project design and the increased number of disciplines or fields involved in a research project.

Research projects have evolved from an earlier style of predominantly single investigator designed and executed to multi discipline research teams, where management structures and communication channels must also be addressed. The research team will often involve experts from disciplines and sub-disciplines necessary to provide the balance of skills and knowledge to support the project. These co-ordination considerations require careful analysis of project design and management to ensure successful conduct.

All research must have a source of funding for ongoing support. External pressure has increased on researchers to find sources of funds and to become more innovative and competitive in attracting or sourcing funds to support research activities. Typical government sources have not been able to provide funds at the rate required to support an expanded research base. Traditional funding sources are unable to support all worthwhile requests for human based research projects. As a consequence commercial partnerships, commercial funding and joint ventures have been developed where the goals

are expanded to include a need for a financial return on a set timescale. The National Health and Medical Research Council (NHMRC) has recognised these changes and reviewed the ethical requirements for research projects involving humans. This resulted in development of the National Ethics Application Form (NEAF) in 2007; this submission form has already been reviewed and updated.

The Australian Defence Human Research Ethics Committee (ADHREC), responsible for oversight of ethics in human research projects within Defence, has monitored advances in ethics requirements and has produced a comprehensive electronic form to ensure that Defence Health ethics standards and implementation conforms with international best practice and can be modified easily in the future. Ethics requirements for projects have increased in parallel with changes in scientific complexity of projects and all researchers have a duty of care to ensure that these standards are met.

The aim of the panel discussion is to use hypothetical scenarios based on ethical questions and dilemmas that may arise in human based research projects to highlight the specific ethical situations that may confront a researcher. Defence, by its nature and structure, has unique ethical issues. These ethical situations will pose increasing challenges to both researchers who design the projects and ethics committees who must review and consider whether approval will be granted for a project. The panel will include experts in the fields of research, ethics, and operations within Defence.

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Transitions

Making it Home successfully - the lessons from 25 years practice in veterans' mental health

Doug Burke

Doug Burke offers therapeutic insights gleaned from 25 years of direct service delivery for veterans and their families, including counselling and group work for individuals, couples and families.

This paper presents an integrated model of intervention to assist trauma survivors who are suffering intrusive reactions from their military experiences. The model draws on an eclectic range of psycho-social theories, combined with expertise in working with veterans and their families.

Some of the major elements of the model include:

- trauma reactions viewed as a survival response rather than pathological symptoms
- trauma reactions often result in specific body patterns that in turn lead to unhelpful behaviours and emotions
- improved personal control is gained through understanding and managing these patterns
- trauma changes the meaning of the sufferer's world. Understanding these changes increases the sufferer's options for preventative management.
- incorporation of activity and body management strategies, based on the growing awareness of the role of the body in human, emotional and behavioural processes
- the importance of the survivor being well supported within their environment.

The paper then focuses on the importance of an integrated suite of treatment approaches including:

- psycho-social education about the impact of the trauma including changes in physical, emotional and behavioural responses
- Cognitive therapies to address how trauma links to everyday emotions and behaviours, so that preventative strategies can be developed
- Skills development
- regular physical activity to build and maintain emotional stability.
- the development of strong relationship and support networks to limit emotional isolation.

This integrated trauma treatment model ensures that veterans make it back home successfully.

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When we sent them back: Investigating the outcomes of multiple deployments to the Middle East area of operations for Australian Defence Force personnel

Amy Curtis

The Australian Defence Force continues to face challenges of adapting to a complex global environment, which has led to an increasing operational tempo (Department of Defence, 2007). Evidence of the ADF rising to these challenges is provided by the continuing rotations in the Middle East, as well as the increasing number of personnel deployed to operations in Afghanistan and Iraq.

In line with the increases in operational tempo is the realistic probability that personnel will experience multiple deployments. Personnel are more likely to experience redeployment to the same operational theatre, thus being exposed to similar operational stressors multiple times. This paper shows that some ADF personnel are redeploying to similar operational theatres up to five times in their careers. Therefore, in maintaining a capable and psychologically ready force, it is important that we investigate the psychological outcomes of multiple deployments.

This paper will explore the outcomes of multiple deployments on ADF members' mental health (post-traumatic stress, anxiety and depression symptomatology), morale and career intentions. The findings of this paper were identified as part of ongoing mental health screening of ADF personnel deployed to MEAO from 2002 to 2007. Analysis using the Return to Australia Psychological Screen (RtAPS) questionnaire administered to personnel prior to returning from the deployment is presented.

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Transforming Defence and Veterans' mental health

John Pead, Darryl Wade, Bronwyn Wolfgang, Susie Fletcher

The involvement of Australia in wars in Iraq and Afghanistan and ongoing peacekeeping missions has created enormous demands on the Australian Defence Force (ADF) and its capacity to meet operational requirements. A significant cost of these wars is the increased prevalence of potentially disabling mental and/or physical disorders and related psychosocial problems among ADF service members and their families. In turn, this has placed greater demands on policy makers and the wider health system to provide the necessary care, treatment and support for affected individuals and their families.

The Australian Government's Mental Health Lifecycle Transition and Family Support Initiative (Townsville) is a major initiative that will contribute to the effective delivery of transition support services for ADF members at risk of or experiencing mental health problems, together with their family members, who are making the transition from military to civilian life.

The initiative is based in Townsville and is led by the Australian Centre for Posttraumatic Mental Health (ACPMH) in partnership with the Departments of Veterans' Affairs and Defence.

The initiative is aimed at ADF members who are being discharged from the ADF in Townsville for medical or administrative reasons, as well as their family members.

This paper will provide an overview of :

- The Australian Government's Mental Health Lifecycle Package including the Transition Management and Family Support Initiative (Townsville)
- Recent policy and service developments in Australia and other Western countries relevant to the Initiative
- Findings from consultations undertaken in Townsville as part of the development phase of the Initiative
- The proposed service model to be developed and implemented in Townsville in collaboration with local partners
- The proposed learning processes to be employed to improve transition support services for ADF members and their families

The evaluation framework for the initiative.

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Deployment to day job: A post-deployment reintegration program for Australian Army service

Geoff Orme

There has been a significant increase in the deployment of military Reservists both on overseas deployments and Homeland security roles in Australia and across many allied nations. The wide variety of functions undertaken by Reservists now extends beyond combat support to almost the full spectrum of military roles. This transformation is detailed in a comparative analysis of Reserve policies of ten nations (Weitz, 2007).

Most Reservists do not deploy with their parent unit and may deploy either individually or in small 'capability bricks'. They may be embedded, or augment the total force. Their subsequent homecoming may occur in a similar fashion, which is reminiscent of the individual rotation policy and attendant concerns for returnees during the US military involvement in Vietnam (Borus, 1973). Consequently, peer and (military) social support, although important for post deployment adjustment (Bartone, 1998) can be difficult and this is exacerbated for regionally based Reservists. Some entitlements to family support and access to other services may also cease with the completion of the Reservist's full time continuous service contract; usually a few weeks after return.

Recent research with UK Reservists (Territorial Army) who deployed to Iraq (Hotopf et al, 2006), indicated a higher prevalence of ill-health outcomes compared to their Regular counterparts. A subsequent study to investigate reasons for this identified experiences on deployment and difficulties with homecoming (Browne et al, 2007). The development of a standardised approach to homecoming, re-entry and post deployment reintegration and the challenges for the Reservists including individual return, have been highlighted in poignant detail by Stendt (2006).

This presentation will cover the development of the first reintegration program specifically for Australian Army Reservists who returned in April 2008 from an overseas operational deployment to the Solomon Islands (OPERATION ANODE). Research conducted with Reservists on previous deployments was incorporated into the development of a post deployment reintegration presentation to all returnees around themes which included relationships, family, returning to a reservist's unit, civilian work and studies, and health. The evaluation of this session will be discussed. Broader challenges around Reservist's decompression, re-entry, homecoming and reintegration will be raised including reference to more developed and comprehensive programs such as the (US) Minnesota National Guard's 'Beyond the Yellow Ribbon Reintegration Program'.

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Training II

Master of Public Health (Defence):
a student's perspective

Libby Smith

Returning to study as a mature aged student and undertaking a University course can be overwhelming and daunting. I wish to present a perspective from a student who is studying the Master of Public Health (Defence) program (MPH) and who is also Non Commissioned Officer Sergeant Medical Assistant in the Royal Australian Air Force.

I attended the AMMA Conference in Brisbane May 2004 and collected a brochure from the Centre of Military and Veteran's Health (CMVH) stand. From this, I discussed with the CMVH staff the possibility of undertaking the MPH program and with their encouragement I enrolled in 2005 at the age of 44 into the program.

The MPH is offered by the University of Queensland through CMVH. The MPH has been designed to enable students to approach Defence health issues from a population perspective. Personnel both from the Department of Defence and Department of Veteran's Affairs are able to undertake the program.

Studying has required enormous support and assistance from family, work and University staff. This support has given me the confidence to continue with the MPH program realizing that it may be many years before I finally complete it. I entered the MPH program at the Graduate Certificate level as I didn't have tertiary qualifications.

The MPH program offers flexible learning choices and approach and is delivered externally and internally. There are numerous advantages with this method, at times I have struggled and discovered some disadvantages.

Since undertaking this journey the enjoyment of studying has returned. I am eager to share a sample of my life as a mature aged student and willing to offer tips and ideas in the hope of encouraging more Australian Defence Force Health personnel to enrol in the MPH program.

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Introduction to Military Medicine Course
inaugural semester report and presentation of the
AMMA Award for the Student of Merit

Scott Kitchener, Genevieve Payne, Isaac Seidl

Tri-service post-graduate vocational education in military medicine has not previously been available in the Australian Defence Force. In response, the Centre for Military and Veterans Health, with support from ADF Health Service Officers and civilians practicing in Military Medicine, has constructed an introduction to the practice of medicine in the military for civilian and uniformed health practitioners – the Introduction to Military Medicine course (IMM).

This course (PUBH7119) was conducted for the first time in semester one 2008. The student intake included Australian and overseas Medical and other Health Service Officers and Non-commissioned Officers enrolled in the Masters in Public Health and nested graduate courses.

The course was conducted externally online and via delivered CD including reference reading. Assessment was completed electronically with two forms of assignment and an on-line discussion. This permitted students to work through the course and assessment while deployed. Students were also able to enrol and complete requirements from interstate locations and maintain progress through postings and other Defence contingencies which would normally prevent continuity of enrolment. Notably, the course did not preclude on-going completion of Service duties.

The content of the course is available via the IMM course website and will be briefly outlined in the presentation. Assessment detail is not available on the website, however, will be discussed in the presentation including the level of responses achieved by students.

The second intake of students began the course mid-year. One of these students has agreed to discuss her experience with the course and the postgraduate Public Health (Defence) program.

The presentation of the AMMA Award for the Student of Merit from the course will conclude the report of the inaugural semester of the Introduction to Military Medicine course.

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Cognitive dissonance and operationally relevant readiness for health personnel in the Australian Army

Richard Mallet

The Australian Army is in transformation; committed to ensuring it is of sufficient size and structure with the right equipment to meet the challenges of increasingly demanding strategic conditions. Within this transformation Army must demonstrate the capacity for providing a broader range of options and forces that can be employed for longer periods in more lethal scenarios. This includes across a range of tasks from humanitarian and disaster relief efforts to more dangerous warfighting operations. The 2005 Hardened and Networked Army (HNA) initiative, 2006 Enhanced Land Force (ELF) initiative combined with the 2008 Force Structure Review (FSR) of Army's Combat Service Support capability, aims to ensure our Army is structured, trained and equipped accordingly.

In light of this ongoing transformation a paradigm shift is also required for maintaining the operational readiness of Army's regular health personnel. Currently, most non-deployed, full-time, health personnel work within Army's Medical Treatment Facilities (MTFs); either Health Support Battalions (HSB), Combat Service Support Battalions (CSSB) or other military units. Health personnel maintain their clinical skills by treating entitled dependencies—regular and non-regular personnel and other authorised members. Within the current system a dissonance exists between Army's understanding of the skills needed to treat this beneficiary population and the skills required during deployment. This necessitates additional clinical training to fully prepare Army's health personnel for deployed roles. The primary feature of a new paradigm for the maintenance of clinical skills would be to establish a national civilian healthcare strategic alliance framework. The idea of relying on the civilian healthcare sector to help accomplish the Army's health mission is not new. This paper contributes to the ongoing debate by exploring whether the civilian sector could be used more comprehensively to maintain clinical skills required for military clinical readiness. Specifically the paper broadly investigates whether regular health personnel could be employed within civilian healthcare facilities on a day-to-day basis. Health personnel would maintain their ties to Army as regular service personnel who are therefore accessible for deployment.

The purpose of this paper, therefore, is to describe the regular Army's current approach to health

personnel clinical skills maintenance. This will include presenting evidence of the discord that exists under the current structure and the success of current strategic alliance arrangements. Results from a targeted set of interviews with civilian health care organisations assessing the feasibility of a new paradigm are then discussed. The advantages and disadvantages of this model from an Army perspective will be presented before finally discussing the rationale behind a model for a national strategic alliance framework.

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COARMC: Co-operative Army Reserve Medicine in Canberra

Andrew Gordon

The COARMC programme was developed to ensure that whenever any Canberra based Army Reserve Unit has a field exercise there would be Army Reserve medical support at the exercise. The key aspect is co-operative because of the paucity of Army Reserve Medical staff in every rank in the Canberra military area. The programme was devised when I was the RMO at SUR and unable to attend a field exercise and neither were any of the other medical staff.

The aims of the project are to;

- ensure an Army Reserve medical person is at every relevant field exercise,
- ensure that the Army Reserve medical staff train together,
- further professional knowledge of military first aid and RAP procedures.
- help with the medical teaching Canberra e.g. first aid training updates etc.,
- develop a young person's network so that even if private x is unable to attend, private y will be able to attend and the message will go up and down the command chain with the desired answer known before the paperwork has commenced.

The programme has been running for 2 1/2 years. The attendance is good. Every available local medical officer has been co-opted to instruct. Most of the lessons are given by the corporals and the sergeants. The teaching facilities are good at the Sick bay and associated facilities at HMAS Harman.

The lessons usually have a theoretical basis followed by a practical application.

Problems may occur when setting up a programme by becoming too closely involved.

Training stores consist of out of date medications, intravenous fluids etc.

The members of the Canberra detachment of the Health Coy of 5 CSSB conduct AHAs one Tuesday night per month. Military medical training occurs on 2 Tuesday nights per month and Unit military

training occurs on the last Tuesday.

The ideas and principles are readily adaptable to other brigades and I am completely happy for all of my notes to be made available to help any person who is interested in commencing a similar project.

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A Clinical Miscellany II

The primary management of maxillofacial injuries from IEDs

Barry Reed, Robert Hale

The new wound management protocol developed by the US Army in Iraq for facial injuries from improvised explosive devices was in response to poor results from using conventional civilian trauma management techniques. This was due to the unique wounding characteristics of IEDS. Several surgical devices were also introduced, which together with the new protocol greatly improved aesthetic and functional outcomes.

This abstract describes how these severe facial injuries from IEDs present as both an initial wound management problem together with a very high frequency of serious infections, a reconstructive surgical problem, and a rehabilitation problem for the Australian Army; and how updating doctrine and health policies to make use of the extensive US Army experience in wound management, together with the introduction of several clinical appliances to the Australian Army would enable world class health care outcomes for future casualties in our deployments. The method with the greatest chance of success in addressing and solving in a formal and systematic manner the increasing military wound care problems described above was via an official government visit by an Australian Army Reserve maxillofacial surgeon to the Brooke Army Medical Center Department of Oral and Maxillofacial Surgery in February 2008 to gain experience in current wound management techniques. The results of this approach have included: 1. development of training modules in primary management protocols for facial trauma from IEDs for the Australian Army. 2. publication with US Army co-authors of a detailed review article on the primary management

of maxillofacial injuries from IEDs in order to summarise contemporary methods of management for training of all military health care personnel involved in facial injury care. In conclusion, establishing a continuing collaborative partnership with the US Army in wound management will promote significantly improved outcomes in relation to facial appearance and jaw function (especially in regard to chewing, mouth opening, swallowing and speech) for future wounded Australian soldiers.

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Bridging the gap: changes required allowing provision of contemporary techniques in forward surgery. Lessons learnt from conflict in the MEAO

Andrew Ellis, Frances Smith, Craig Juresivic, R Geoff O'Connor, W O'Regan, M McKay

The Australian Medical Treatment Facility team (MTF-1) deployed to a forward operating base in Afghanistan from mid January to mid April 2008 embedded in a NATO hospital. Their role was to provide anaesthetic, surgical, and intensive care within an existing facility run by coalition partners.

This report is provided, not so much to review the fine clinical details of the AUS MTF Experience, nor the 67 operative cases carried out, but to draw upon this experience with the provision of Level 3 Health Support (AUS terminology) and to emphasise lessons learned and suggest pathways for improvement.

The principle lesson of the present is that blast and fragmentation from IED will wound with extraordinary damage to the human corpus. The whole tenet of asymmetric warfare is to damage morale and mission by sudden brutal demoralizing strike in a political environment in which the loss of life of the military personnel carries sensitive consequence. Protection by warfare means have been developed (fighting doctrine, personal protection, offensive and defensive technology). It is time that health protection by means of appropriately equipped hospitals with appropriately trained staff are developed and maintained to meet this threat.

The recognition and practice of damage control surgery and resuscitative intensive care will save lives in this setting. Stopping bleeding by rapid surgical means combined with re-warming and rapid high volume transfusion, including factors (Fresh Frozen Plasma, Platelets and Factor 7) to overcome the lethal triad of acidosis, coagulopathy and hypothermia are the key treatment modalities. Carrying this level of care out in the austere military environment is problematic. The message is get this surgical and anaesthetic care as close to wounding as possible (i.e. forward) and structure health resources to match this need.

This paper discusses aspects of doctrine, training, equipment and resources that should be developed/ or use reinforced to draw upon the lessons learnt from contemporary conflict.

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Exercise related groin pain

Tony Delaney

Exercise related groin pain is a common cause of disability in ADF members. A systematic approach to history and examination will yield a diagnosis in most cases.

Differential diagnosis includes;

Enthesitis/ tendonopathy /bursitis / strains of adductor, sartorius, rectus femoris, iliopsoas, trochanteric and tensor fascia lata, and conjoint tendon tears

Nerve entrapments ilioinguinal, genitofemoral, obturator and lateral cutaneous nerve of thigh,

Herniae inguinal and femoral.

Joints. Osteitis pubis. Acetabular labral tears may result from acute trauma or hip dysplasia.

Referred pain Abdominal, pelvic and spinal pathology may present as groin pain.

Biomechanics Attention to biomechanics, ie leg length discrepancy, gait and orthotic correction will aid diagnosis and management.

Imaging Plain Xray, specialised musculoskeletal ultrasound and MRI may be indicated.

Surgery may involve hernial and conjoint tendon repair, neurolysis, and hip arthroscopy.

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Crisis? What Crisis? - Crisis and Capability

The Australian naval and military response to the 1918-19 influenza pandemic in the South Pacific

Michael Dowsett

Between April 1918 and May 1919 influenza, or its secondary complications, caused up to 50 million deaths worldwide. Some of the most virulent outbreaks occurred in the islands of the South Pacific, where among the indigenous population few escaped the infection.

In November 1918 the Commonwealth Naval Board formed a joint relief expedition from among available naval and military medical personnel and it embarked on HMAS ENCOUNTER deploying teams to Fiji, Samoa and Tonga.

This was Australia's first overseas relief expedition and, although unusual for the times, foreshadowed the now regular employment of ADF assets to provide humanitarian assistance.

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The medical wing of the Liberation Tigers of Tamil Eelam

John Whitehall

The Liberation Tigers of Tamil Eelam LTTE was formed in the late 1980's in Sri Lanka by Tamils who perceived an intent for racial genocide in the post independence laws and practices in that country. Accordingly, a Tamil independence movement was formed with both political and military wings. Early casualties were evacuated by sea to the care of supporters in nearby Tamil Nadu of India but the mortality rate was high. As warfare intensified, the hospital in Jaffna was used by the Tigers but, faced with the loss of that facility, the LTTE leadership decided to create its own medical wing.

In 1992, seventy five likely doctors were recruited from the infantry and began a course of medical study parallel to the established curriculum of University of Jaffna. Some students had not completed high school and were given a preparatory course of basic sciences and English which would be the language of study.

The course was disrupted by periods of warfare in which the students joined field hospitals under the guidance of the several graduated doctors who had joined the movement. From the early improvised casualty centres, a highly organised tier of medical care evolved: casualties were attended on the front lines by medics, transferred to resuscitating units at the rear of the lines, then to tertiary field hospitals in prepared bunkers beyond mortar range where major operations were conducted, before transfer to base hospitals, beyond the range of artillery. Organisation improved to the extent the facilities could be constructed on the night before an attack, reducing chances of enemy detection.

Improvements in the structure of care were accompanied by developments in provision of care: there was medical selection of recruits, then vaccination, then universal blood typing, then collection of blood before operations and battle field transfusions, then the ability to return blood from thoracic collections.

In the process, surgical experience deepened and students became competent in such procedures as end to end arterial anastomoses under ketamine anaesthesia by torchlight in a bunker under artillery fire.

Medical knowledge was gained through conjoined responsibility for civilian hospitals with doctors from various aid organisations, and by tuition from visiting specialists, especially in the cease-fire from 2002 to 2006. Public health experience was gained in malaria and cholera prevention. Disaster management was also learned in the tsunami of 2004 which ravaged the coast of Tamil Eelam.

After 14 years of preparation, the 32 students who had remained in the course (five had been killed on duty) were ready for graduation at the end of 2006 but had not yet received a semester of paediatrics. The author happened to arrive at this time and completed their tuition.

As part of that course, research projects were initiated in childhood nutrition, casualties, snake bites and emotional stress. In the three months of close contact with the students, the author learned of their motivation for joining the Tigers, their experiences in the field, the development of the military wing and their hopes for the future.

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Royal Australian Air Force aeromedical evacuation capability with the introduction of the C-17 Globemaster into service

Michele Cole, Robyn Tatnell

On the 3rd March 2006, the then Minister for Defence, Dr Brendan Nelson announced plans to acquire four Boeing C-17 Globemaster III aircraft and associated equipment to provide the Australian Defence Force (ADF) with a heavy airlift capability. The fleet of four aircraft give Australia a new Responsive Global Airlift (RGA) capability, significantly enhancing the ADF's ability to support national and international operations, and major disaster rescue and relief efforts. It was the fastest purchasing decision of this kind in recent memory. The first aircraft arrived to 36 Squadron in December, 2006. The second arrived 6 months later in May 2007 and September 2007 saw the first aircraft achieve Initial Operating Capability. The last of the four airframes arrived in Amberley in March this year. According to OC 86WG GPCPT Gary Martin, 36SQN has been working toward role expansion to achieve full Operational Capability by 2011.

In the second half of 2007, "end-user" participation in preparation for certifying the Aeromedical Evacuation (AME) capability for the C-17 began with an AME conversion course at Hickham Air Force Base, Hawaii. Eleven personnel attended this training, four members from an operational health squadron and 7 members from RAAF health training units.

Conversion Training was obviously only one part of the AME capability development. Much effort, and of course money, has been invested into equipment development and the acceptance of the C-17 specific AME equipment into service. Head Quarters Health Services Wing has clearly been heavily involved in the process and staff has developed an Australian version of an AME conversion course.

On the 12th March 2008, Health Services Wing participated in the Operational Test and Evaluation (OT & E) mission. The scenarios tested the C-17's ability to carry up to six high dependency intensive-care patients, medium dependency litter patients as well as low dependency or "walking wounded". A total of twenty-two sets of high dependency patient systems will be purchased for operation within this platform allowing three aircraft to operate in the AME role simultaneously with spare sets. As stated by GPCAPT Martin, this has been the first major update to AME capability since the introduction of the C-130 Hercules aircraft decades ago.

Three aeromedical stations, each designed to accommodate three litters are stowed permanently

in the cargo compartment. Complete installation includes these three litter stations plus an additional nine litter stations giving a total of thirty-six litter positions in the aircraft. The stations are free-standing in design, supported by horizontal arms attached to vertical stanchions. Each station is equipped with a utility panel that provides each litter position with a light, call button and a drop-down passenger oxygen mask. Provisions at each station include electrical and oxygen connection points. Five therapeutic oxygen outlets are located on the right cargo compartment sidewall allowing for the delivery of oxygen to masks or ventilators. Six electrical accessory outlet panels supply power to the aeromedical stations.

This presentation will recount the short history of the introduction into service of the C-17 Globemaster aircraft from an AME perspective, examine the current situation and explore current plans for future direction.

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Adaptive campaigning: Implications for military health care

Susan Neuhaus, Richard Mallet

'Adaptive Campaigning – The Land Force Response to Complex Warfighting' provides a philosophical framework to meet the complexities and demands of current and future military operations. Moves towards 'whole of government' operations and 'effects based operations' have specific implications for the creation of health based effects and health provision.

Adaptive campaigning identifies 5 lines of operations that may need to be addressed during a campaign. Each of these carries implications for Health Support:

- a. Joint Land Operations
- b. Population Support
- c. Population Protection
- d. Indigenous Capacity Building, and
- e. Public Information.

The role of Operational Health Support has traditionally been seen as conservation of combat power. To meet the challenges of Adaptive Campaigning, Operational Health Support must move beyond its traditional boundaries and revisit the unique challenges and opportunities that 'health effects' can bring to help

achieve operational success. To meet these challenges, deployable health elements will need to adapt their current organisation, equipment and training.

This paper will highlight the implications for health care provision inherent in Adaptive Campaigning and will detail some of the doctrinal, organisational, philosophical and equipment challenges that will be required.

The scope of the paper is as follows:

- a. A summary of the conceptual basis of Adaptive Campaigning,
- b. A discussion of the aspects of Adaptive Campaigning that directly affect concepts of CHS, and
- c. Identification of key training liability gaps that need to be addressed.

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Military humanitarian assistance and adaptive campaigning - potential for future military health capability identified in Afghanistan and other theatres

Edward Barin, Sarah Winter, Andrew Ellis, Richard Mallet

Australian operational experience in the past decade across peace-support operations and war-fighting has repeatedly identified civilians entering the military medical system. Military operations under the Adaptive Campaigning (AC) construct increasingly require humanitarian factors to be taken into account.

During the recent deployment of AUSMTF-1 to Afghanistan (AFG) it was found that 28% of treated local nationals with serious injuries were children. Employing resources which are usually applied to adult casualties proved a challenge in the management of these patients. In Medical Community Assistance Programs (MEDCAP) in East Timor (OP ASTUTE), a multinational Military Medical Readiness exercise in Indonesia (EX Tendon Valiant) and a domestic community aid program (AACAP) similar demographic profiles of local people receiving treatment from ADF health teams were encountered.

In AFG, trauma management in children required tailoring of protocols and equipment which was not available in standard load lists. Acute and chronic childhood and maternal diseases faced the teams

working in remote indigenous communities in East Timor, rural Indonesia, and Northern Australia. Therapeutic opportunities in these areas of operations in children and women ranged from resuscitation (including burns), medications, pathological diagnosis, imaging, to corrective surgery, as well as primary preventive care.

- Although skill training is available to surgeons, these civilian health management issues go beyond the usual broad scope of current ADF health doctrine and training for the majority of health personnel.
- There are readily identifiable critical determinants of medical support in any type of operation. The delivery of a fully effective medical capability increases opportunities for planning and tailoring personnel and equipment.
- Extension of current programs for the medical force structure, to assist children and women in particular, is required. This will meet the medical tasks set under AC, for example, where large refugee populations are seen, host nation medical infrastructure is disrupted or lacking, and coalition partners have incongruent medical assets.

It would be an advantage to offer proficiency training in areas such as paediatric resuscitation, paediatric intensive care, acute burns care, transfusion protocols, neonatal care, obstetric emergencies, elderly care and tropical medicine and infectious disease. Corresponding equipment gaps should be addressed.

As it is likely that future ADF health capability requires the military Casualty Care Continuum be prepared for this demographic challenge, serious work lies ahead to articulate challenges, then prepare personnel, adapt equipment and train teams.

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Mental Health

Primary care presentations of post traumatic stress syndrome: A case series analysis

John Shephard

Background: Recent operational demands of the ADF have seen members exposed to a variety of traumatic events in a range of peace-keeping, humanitarian and, increasingly, conflict roles. Surveillance studies of large populations of US and UK veterans following deployment in Iraq and Afghanistan has found high rates of PTSD. There is evidence of similar rates in ADF veterans. Due to the complex stigmas involved, however, only a small percentage of these are accessing care. Untreated PTSD results in large impacts on individuals, their families and workplace performance.

Aim: To investigate the clinical pattern of presentation of PTSD in a high readiness Infantry Battalion and, in particular, to examine facilitators and to barriers to diagnosis.

Methods: We conducted a clinical case review of PTSD diagnoses, confirmed by Psychiatric opinion, managed through the RAP over a twelve month period. We examined nature of trauma, time to diagnosis, path to diagnosis, reported barriers to seeking help and retention of the member.

Results: We identified 5 confirmed cases of PTSD with exposures related to deployments to Rwanda, Timor Leste and Iraq. Trauma reported related to non-battle fatalities and was strongly associated with feelings of shame, guilt and regret associated with these events. Mean time to diagnosis was 47 months and, in all cases, was via established, trusting relationships with care givers, often during unrelated routine medical processes. Multiple barriers to presentation were identified including poor knowledge of symptoms, trivialisation of exposures and fear of discrimination. Three of the cases are progressing to medical discharge.

Discussion: Whilst only a small number of cases were examined in this series, the qualitative results have important implications for ADF health care policy development.

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The special needs in the dental care of veterans suffering from PTSD

Norton Duckmanton

Veterans, from the Vietnam Conflict who are suffering from PTSD, exhibit in addition to their more obvious need for dental care, seemingly unrelated symptoms, which need to be appreciated and understood by the treating oral health practitioner.

The most frequent dental manifestation of this disorder is stress relief by oral parafunctional muscular activity, which may cause myofascial pain and dysfunction, clenching, bruxism, pathological abrasion of tooth structure, fracture of cusps and dental appliances, splitting of the crowns and roots of individual teeth, as well as early failure of implants to achieve osseointegration.

Concomitantly, personality changes and aberrant behaviour (often bordering on being antisocial) may be apparent. It is essential that their dental providers should be aware of the causes and implications of these symptoms. This aspect of the patient's treatment is so important that the patient's psychiatrist should be involved as part of the treating team.

The most successful treatment strategy might include an early recognition and diagnosis of the disorder; preventive measures instituted to limit the deleterious effects on the dentition, the timely enlistment of psychological and medical help, and the use of occlusal protective splints. These measures may be helpful in ameliorating the initial symptoms and in preventing the gross destruction of tooth structure seen in the later stages of the disorder. A remission of the symptoms may be achieved in this manner and a recurrence prevented. Restorative treatment should be kept as psychologically atraumatic and dentally simple as possible. The restorations will be subjected to excessive occlusal loads and provision should be made for this in the design of restorations and appliances. Special care needs to be taken to eliminate all contact between newly placed implants and any overlying dentures during the whole period of osseointegration so that this process may proceed unhindered.

Post treatment therapy should feature protective appliances, regular supervision and psychologic supportive care.

Typical clinical cases will be described and illustrated.

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A predictive model of PTSD investigating pre-trauma, trauma exposure, and post traumatic factors

Cherie Nicholson

Post-Traumatic Stress Disorder (PTSD) is a severe, enduring, and dysfunctional combat stress reaction. By definition exposure to trauma is the key antecedent to PTSD, however not all individuals exposed to the same trauma will develop PTSD. For this reason, risk factors related to the individual including their environment, support resources, interpretation of the event, and biological factors are of interest to researchers. There is little consensus between studies of PTSD with meta-analysis studies reporting large variation in the types of factors thought to predict PTSD. These factors can be broken down into three broad categories; pre-trauma vulnerability, trauma exposure, and post-trauma factors. Many of the explanatory models of PTSD that have been tested are limited in one or more of these three key categories.

Mental health support among deployed Australian Defence Force (ADF) personnel continues to be a major priority for the ADF. This support takes many forms including a debriefing process which uses a questionnaire to screen recently deployed personnel for mental health issues. The questionnaire is administered to personnel as they return home from deployment and a similar version is administered several months later to monitor reintegration. The questionnaire includes several measures of psychological health, some basic demographic items and questions surrounding personnel perceptions of the deployment. In addition to this, applicants seeking to join the ADF also receive basic psychological screening.

Based on a review of the current literature, a structural equation model was developed that would allow testing of the strength of the relationship between pre-trauma, trauma exposure, and post trauma factors. The first section of the model makes use of results from psychological recruitment screening carried out in the 1990s to look at the effects of pre-trauma variables on post deployment mental health. Current mental health outcomes are measured by the post-deployment mental health screens described above.

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Change agility capability:
The force multiplier of mental health

Karl Matthews

The Future Air and Space Operating Concept (FASOC 2007) recognizes that at the heart of the Air Force future is the ability and professional mastery of the staff to adapt their approach as needed. As a result, one of the FASOCs four fundamental developments is 'to practice adaptive Command and Control for flexible operations'. This paper considers the FASOC 2007 direction to be more achievable by developing staff 'Change Agility', which thus becomes a mental health management issue.

Previous research into organizational change concluded that Change Agility is inherent within the individual. Unified physics suggests that the stimulating force required to change a conscious entities tangible energy state is proportional to the amount of intangible resistance organically generated within their semi-tangible mental state. In effect this equates that an individuals (tangible) Change Agility response to stimuli is an (intangible) mental health issue. Consequently, by augmenting the mental health of the individual, their Change Agility Capability can be enhanced, resulting in their greater flexibility to change and adapt - just what the FASOC requires!

A proposed indicator of an individual's Change Agility Capability is their MBTI preference toward Intuitive Perception (NP) rather than Sensed Judgment (SJ). As western military establishments tend toward attracting and retaining high SJ preference individuals, there is a risk that if the mental health of SJ staff is not nurtured toward NP fluency, the Australian Defence Force will evolve a low Change Agility Capability culture. This situation further stifles remaining individual Change Agility, creating a stagnation effect to counter FASOC ambitions. It is proposed that this situation is recoverable by training SJ preference individuals to become more fluent across the SJ/NP dichotomous continuum, and thus mature toward improved Change Agility Capability.

The history of human warfare / endeavor is full of examples of how Change Agility Capability has enabled victory (and vice-versa), so surely one ignores its force multiplier effect at great risk. The consequence of this mental health issue may be of most significant consequence for the ADF if engaging with an operationally, tactically or strategically agile opponent (i.e. asymmetric terrorists), when requiring rapid adaption to new equipment (i.e. the C-17 AME platform), or in response to disaster health challenges (i.e. cyclones). In conclusion, it is proposed that in order to better implement the FASOC directive for adaptive and flexible command and operations, methods to augment the Change Agility Capability of ADF staff should be immediately implemented. Ironically, this Military Mental Health proposal in itself tests YOUR change agility capability performance!

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Deployment and mental health:
An overview of findings from post
deployment psychological screening

Helen Benassi

The Return to Australia Psychological Support (RtAPS) screening programme provides comprehensive information on the psychological wellbeing of Australian Defence Force (ADF) personnel returning from operational deployments. As part of the provision of psychological support to operations, the Psychology Research and Technology Group (PRTG) routinely monitors and reports on the mental health of deployed ADF personnel.

In 2007-2008 PRTG established baseline levels of mental health screening rates for deployed personnel, as well as releasing updated mental health

surveillance data for Operation Catalyst. Research projects focused on the association between mental health and risk factors such as multiple deployments and occupational stress. In addition, research on the impact of mental health on the 'organisation' focused on the relationship between mental health, retention and morale for deployed ADF personnel.

The aim of this presentation is to provide an overview of research and mental health surveillance conducted throughout 2007 and 2008 by PRTG. The presentation also addresses the limitations of using surveillance data to estimate mental health problems within the ADF.

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Of Symptoms, Psychology and Deployment

Service personnel who have sought
medical consultation for mental health
conditions: Associated patterns of morbidity

*Alexander McFarlane, Susan Treloar, Annabel McGuire,
Michael Waller, Cate D'Este*

Introduction and aims: The Defence Deployed Solomon Islands Health Study (Solomon Islands Health Study) is the first study in a research program that aims to assess the health and wellbeing of Australian Defence Force (ADF) veterans who have deployed on active service overseas. It was conducted by the Centre for Military and Veterans' Health (CMVH) as part of the Deployment Health Surveillance Program (DHSP) and funded by the Department of Defence. This paper investigates medical diagnosis and treatment seeking for mental health conditions and associated patterns of morbidity in this study sample.

Methods: The Solomon Islands Health Study Nominal Roll included all individuals who deployed to the Solomon Islands as part of Operation ANODE before 1 January 2006 and a randomly selected comparison group of ADF personnel, frequency matched to the veteran group on sex, age group, service and service type, who did not deploy during the same period. To conduct the research reported here, 500 veterans and 500 comparison individuals were randomly selected from these larger groups. The Solomon Islands Health Study included data gathered from mortality and cancer incidence

registries, a comprehensive self-reported health status questionnaire, a deployment experiences questionnaire, and health and psychology records retained by the ADF. Self-report questionnaires were completed by 44% of the sample in 2007. The self-report Defence Health Questionnaire asked veterans and currently serving members to indicate from a list any medical conditions for which they had ever been diagnosed or treated by a medical doctor. If endorsed, year of first diagnosis and whether the condition had been treated by a doctor in the past year were also requested. The list of conditions included "anxiety, stress or depression".

Results: Approximately 16% of the veterans group and 19% of the comparison group report a lifetime history of medical diagnosis or treatment for anxiety, stress or depression. The lifetime rate of treatment seeking is higher than suggested by the Return to Australia Psychological Screen (RtAPS) and Post Operation Psychological Screen (POPS) data which showed that in the Solomon Islands' veterans, only around 2% would have reached the levels for caseness. Self-reported rates of medical treatment for these conditions in the past year will be compared with data from other sources. Data from the Annual Health Assessment has also been collected from these individuals' Defence Health records, as well as other self-reported health conditions and current mental health. This paper will identify factors associated with medical consultation for mental health conditions in a

chronological context. Furthermore, associated other self-reported conditions for which these individuals were seeking treatment will be outlined.

Discussion: These data explore the relationship between medical diagnosis and treatment and indicators of psychological and mental wellbeing of members of the Australian Defence Force.

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The relationship and differentiation of mild traumatic brain injury and PTSD in veterans from the Middle East

Jeffrey Rosenfeld

Bomb blast exposure results in the complete spectrum of traumatic brain injury (TBI) from mild concussion to penetrating brain injury with severe cerebral swelling. Proximity to the blast is a key determinant of severity. Mild TBI (concussion) in US soldiers deployed to Iraq is strongly associated with Post-Traumatic Stress Disorder (PTSD) and physical health problems. Multiple blast exposures may be cumulative in their post-concussional effects. PTSD and depression are important mediators of the relationship between mild TBI and physical health problems (Hoge et al). Health problems following mild TBI may be due primarily to PCS and depression. Post-concussional syndrome (PCS) includes problems with memory, concentration, balance, sensitivity to light and sound, tinnitus, and irritability. It is difficult to differentiate the symptoms of severe stress from those of mild TBI and PCS. Depression further complicates the clinical picture. This is also made more challenging by retrospective accounts of injury. Having a record of post-traumatic amnesia (PTA) is important evidence which can identify a definite TBI. Ongoing headache tends to be a feature of TBI rather than stress or PTSD (Hoge et al). CT scan findings if available may also be helpful. Biochemical markers may also provide objective evidence of concussion. Comparisons of pre- and post-deployment cognitive screens would be helpful in the investigation of cognitive deficits following blast injury. Injury to the prefrontal regions of the brain due to blast may alter the brain's regulation of stress and anxiety and contribute to PCS and possibly PTSD.

We are likely to experience increasing numbers of Australian Personnel returning from the Middle East/Afghanistan who have had exposure to blast injury and we need to consider and document the TBI element

when assessing other aspects of their mental status. We should consider cognitive and psychological screening prior to deployment into combat zones. There is still reluctance by military personnel to self-report mental health problems. We must continue to address this problem and reduce the stigma attached to mental health problems. Educational and treatment programs are effective in reducing PCS and depression. Investigation of strategies to mitigate the immediate blast effects to the brain are currently under investigation.

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Determinants of new-onset and persistent symptoms of PTSD after deployment and reported combat exposures in the US Millennium Cohort

Tyler Smith

Background: Since 2001, military conflicts in Iraq, Afghanistan, and neighboring regions have exposed U.S. and coalition military service members to intense and prolonged physical and psychological stressors. The long-term effects of such exposures may have profound impact on the health and functioning of deployers both in the short and long-term.

Objectives: To prospectively investigate determinants of new-onset and persistent PTSD symptoms or diagnosis in a large population-based U.S. military cohort, of whom many deployed in support of the wars in Iraq and Afghanistan.

Methods: This study utilized data from the Millennium Cohort Study, the largest population-based prospective study of U.S. military service members designed to examine the long-term health effects associated with military service. Baseline (July 2001- June 2003) and follow-up (June 2004- February 2006) questionnaire data were used to assess PTSD as measured by the PTSD Checklist-Civilian version (PCL-C) using Diagnostic and Statistical Manual of Mental Disorders, 4th ed. (DSM-IV) criteria with and without a 50-point minimum. Participants who deployed in support of the wars in Iraq and Afghanistan between baseline and follow-up questionnaires were considered deployed. Experiences reported at follow-up were used to assess combat exposure during deployment, based on affirmative responses to witnessing death,

trauma, injuries, prisoners of war, or refugees. Demographic, behavioural, occupational, and deployment characteristics were used to describe subpopulations of the US military with differences in new-onset, persistent, or resolved PTSD symptoms between baseline and follow-up. Prior assault and functional health at baseline were investigated for possible modifying of effect of combat deployment and new-onset PTSD symptoms.

Results: One fourth of the Cohort deployed between baseline and follow-up. New-onset PTSD symptoms or diagnosis were found in 8.7% of deployers reporting combat exposures, 2.1% of deployers reporting no combat exposures, and 3.0% of nondeployers. Reserve and National Guard, healthcare specialists, current smokers, and those reporting potential alcohol problems were at increased adjusted odds of new-onset and persistent PTSD symptoms. Among those with baseline PTSD symptoms, deployment did not impact persistence of symptoms. Both male and female combat deployers reporting prior assault at baseline were twice as likely to report new-onset PTSD symptoms or diagnosis post-deployment when compared to those reporting no prior assault. Combat deployers in the lowest 15 percentile of mental and physical functioning at baseline contributed over half of the new-onset PTSD symptoms or diagnosis.

Conclusions: This large, population-based, prospective study describes new-onset and persistent PTSD symptoms or diagnosis as they relate to deployment. After adjusting for baseline characteristics, these prospective data indicate a threefold increase in new-onset PTSD symptoms or diagnosis among deployed personnel reporting combat exposures. Findings define PTSD in this population and emphasize specific combat exposures, prior stressful experiences, and pre-deployment functional health, rather than deployment itself, significantly affect the onset and persistence of PTSD symptoms postdeployment.

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Physical and psychological comorbidities for multisymptom illness in Australian Gulf War veterans

Helen Kelsall, Malcolm Sim

Increased symptom reporting and chronic multisymptom illness is more common in Gulf War (GW) veterans than in military comparison groups, and this may be an important factor in future health burden in this group. One study of US GW veterans (Blanchard et al, 2006) that had objective health measures available to it found several physical and psychiatric measures were comorbid with chronic multisymptom illness. Identifying comorbid medical and psychological conditions and health services utilisation is desirable as they can have important implications for management of these people's health.

The Australian Gulf War Veterans' Health Study was a cross-sectional study conducted from 2000 to 2002, and included comprehensive medical, psychological, reported health and exposure assessments of 1456 veterans of the 1990/1991 Gulf War and 1588 military comparison group. Our aim was to compare the prevalence of multisymptom illness in GW veterans and comparison group subjects, and to compare comorbidities in GW veterans with and without multisymptom illness.

A multisymptom illness case in our study was defined as having one or more current (within the past month) symptoms, rated as moderate or above, in three or more classifications. The classifications comprise fatigue, and three factors (psycho-physiological distress, cognitive distress, and arthro-neuromuscular distress) empirically determined through factor analysis utilising the symptom questionnaire in our baseline study. Our case definition was based on the CDC definition established by Fukuda et al (1998) in US GW veterans and adapted for the further study of US and UK GW veterans (Blanchard et al, 2006; Unwin et al, 1991).

We found that male Australian GW veterans were almost twice as likely to have a multisymptom illness as military comparison group subjects (25.6% vs 16.0%; odds ratio 1.81; 95% CI 1.50 - 2.18, $p < 0.001$) based on the case definition used in our study. In this presentation we will compare GW

veterans with and without multisymptom illness on several comorbidities, with a focus on objective factors, especially those not published previously, including:

- o Physical: fitness step test, serology, chronic inflammatory and several haematological and biochemical markers, lung function indices, neuropathy score, body mass index and waist circumference.
- o Psychological: posttraumatic stress disorder, major depression, alcohol use disorder, psychological distress, and general physical and mental well being.
- o Functional impairment and hospitalisation.
- o Gulf War related exposures: e.g. vaccinations, taking pyridostigmine bromide tablets, phase and duration of service in the Gulf War.

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Mentally prepared - developing a mental armour for operations: A multi-level program to build resilience in the Australian Defence Force

Stephanie Hodson, Andrew Cohn, Margaret Goodman

Psychological resilience in the face of the adversity is crucial for Australian Defence Force personnel in order to optimise operational effectiveness and minimise psychological ill-health. This paper will summarise current literature in relation to building resilience and proposed a framework for understanding resilience in a military context. This framework is the rational behind a proposed multi-level program designed to build psychological resilience or mental armour for personnel. The program which has been funding through the Government Life Cycle initiatives, including a five year longitudinal study to define the concept of resilience in the Australian context, as well as establishing baselines to assist in the evaluation of resilience building interventions across the training continuum.

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