



# General Sir John Monash Research Centre **Capability Statement**



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## **Executive Summary**

Monash University and its clinical academic partners at The Alfred Hospital are proposing to bring together their extensive clinical and public health research and education expertise across a wide range of disciplines relevant to the health of military personnel and veterans by establishing the General Sir John Monash Research Centre: Advancing military and veterans' health. This centre will build upon a strong existing track record of achievement in this field and develop new areas of research and education to provide evidence-based research to deal with emerging issues relevant to these groups to assist with policy development and practice for the Departments of Defence and Veterans' Affairs. The Centre has a skill base, resources and record of achievement which will enable it to accomplish the following:

- Investigate longer term health outcomes, including the most effective models of care, rehabilitation and health promotion programs
- Continue existing longitudinal studies and develop new cohorts and/or registries to monitor the health of specific military and veteran groups, including those in transition to civilian life, at the Monash Centre for Occupational and Environmental Health (MonCOEH)
- Collate and analyse existing DVA and Defence health and exposure data to address important questions regarding risk factors for diseases and injury and health services use, using expertise from the Biostatistics Unit
- Undertake clinical research into the treatment of trauma, burns and other acute health events, as well as use of blood products, employing established registries for burns, trauma (VSTORM) and massive transfusion
- Undertake predictive modelling to estimate trends of disease incidence into the future to assist health service planning, using the expertise of the Epidemiological Modelling Unit, the Health Services Management Unit, and the Centre for Research Excellence in Patient Safety (CREPS)
- Investigate compensation systems and models of care, including international benchmarking, in collaboration with the Institute for Safety, Compensation and Recovery Research (ISCRR; a Monash University entity)
- Investigate the most effective means of translating research findings into practice and effective dissemination to relevant stakeholders in collaboration with the Australasian Cochrane Centre and ISCRR
- Teach short courses in areas of need for continuing professional development, such as the Australian Certificate in Civil Aviation which is currently offered through Monash University
- Train clinical personnel in the specialist treatment of trauma, burns and other acute health outcomes, as well as the longer term management of these conditions.
- Train clinical professionals ranging from nurses and paramedics to medical specialists.

This research community, at Monash University and The Alfred Hospital, also has in place extensive collaborative networks to add in further specialist research capability, where needed. It also has a strong track record of attracting NHMRC and ARC support which can supplement available DVA and Defence research funds. Research centres and units aligned to the Monash Centre have a history of working closely with government and industry sectors, as well as ex-service organisations, military personnel and veterans.



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## Introduction

Australia has approximately 58,000 active service men and women, as well as 22,000 active reservists. Many of these personnel have been deployed in combat and peace-keeping missions. These operations put personnel at risk of being disabled by illness, physical injury, post-traumatic stress disorders and other mental health problems.

There is a strong obligation to provide for the health needs of military personnel and to ensure access to the necessary health services for military veterans and their families. In addition, the health services supporting the military should be prepared for future innovations in warfare which may present new health challenges for soldiers and other personnel.

The capabilities required to meet these challenges are ideally located in a strong research environment with access to high level expertise in relevant areas. They include:

- Training: including clinical training and post-graduate education in areas including pre-hospital care, trauma surgery, clinical medicine, public health, occupational health and environmental health
- Research: including observational cohort studies of veterans, clinical trials, predictive modelling and the ability to analyse large datasets
- Information resource: including high level expertise in medical specialities, psychiatry, public and occupational health, rehabilitation, compensation and a variety of related fields

The essential skill base includes surgery, clinical medicine, allied health, public health, epidemiology and other research methods. Close links must be available with a variety of external parties such as ambulance authorities, Red Cross blood transfusion services, research organisations and health departments.

In this document, we outline the capabilities present at Monash University and the Alfred Hospital, particularly at the Alfred Medical Research and Education Precinct (AMREP) which are relevant to the support of military and veterans' health.



## Veterans' Health – Research Domains

## Monitoring the long-term health of veterans (longitudinal studies)

The Monash University Centre for Occupational and Environmental Health (MonCOEH) has more than a decade of conducting longitudinal studies of the physical and mental health of veterans:

- Australian Gulf War Veterans' Health Study (baseline and follow-up studies)
- Korean War Veterans' Health Study
- Systematic reviews of mental health outcomes in veterans populations
- Contribution to the Australian Peacekeepers' Health study and the Middle East Area of Operations study
- Joint Australian and US comparative study of Veterans' health service use

Health outcomes investigated in these studies include:

- Cancer and mortality patterns
- Life satisfaction, quality of life and functional measures
- Uptake of vaccinations and health effects
- Neurological status
- Respiratory health after exposure to dust storms and oil fire smoke
- Health services utilisation using DVA, Medicare and Pharmaceutical Benefits Scheme data
- Post-traumatic stress disorder, depression, alcohol use and other mental health outcomes

This research has been led by Professor Malcolm Sim, and MonCOEH has a wide range of skills and experience to enable it to conduct very large longitudinal epidemiological studies, including linkage to other databases for outcomes such as cancer diagnoses and death, with a high degree of competence.



## Modelling the future health status of veterans

A joint initiative in epidemiological modelling has recently been established between the School of Public Health and Preventive Medicine and the CSIRO's Preventative Health Flagship and Complex Systems Science to conduct research to predict trends in chronic disease and future health service requirements. Associate Professor Manoj Gambhir, from Imperial College London, who has done extensive work modelling trends in infectious diseases in developed and developing countries, will lead the program following his appointment in December 2013.

## Clinical trials to improve the health of veterans (intervention studies)

Monash University has a long history of conducting randomised controlled trials which are widely recognised internationally and published in top-ranked journals. For example, a study of particular relevance to healthy elderly veterans and their spouses/partners, ASPREE, is currently underway.

ASPREE is a randomised controlled trial designed to assess whether daily low dose aspirin therapy prolongs healthy lifespan through the prevention of heart attack, stroke, cognitive decline, physical decline and some cancers such as bowel cancer. The study is recruiting 19,000 healthy individuals aged 70 years or more in Australia (Victoria, Tasmania, South Australia, NSW and ACT) and the USA. It has substantial funding from the USA, National Institutes of Health (\$50 million USD), as well as contributions from Australia. In addition, there are sub-studies:

- ASPREE Biobank involves collecting blood samples to identify parameters for earlier prediction of serious disease
- ASPREE-ALSOP for the improved understanding of the problems of ageing including those related to mobility, hearing, eyesight, dental care, diet and exercise.
- A study investigating the significance of biomarkers for cancer development and the effect of low-dose aspirin on cancer prevention (funded by the Victorian Cancer Agency and US National Institute of Cancer)
- Other sub-studies are investigating outcomes such as macular degeneration and sepsis

Should DVA or Defence identify suitable research questions in relation to healthy elderly veterans, sub-studies could be added for investigation among those included in the ASPREE study.

### Research into compensation and rehabilitation issues affecting veterans

DVA and Defence have recognised the need to improve rehabilitation and compensation of veterans. The Institute for Safety, Compensation and Recovery Research (ISCRR), a joint initiative of WorkSafe Victoria, the Transport Accident Commission (TAC) and Monash University, was formed in 2009 to facilitate research and best practice in injury prevention, rehabilitation and compensation systems.

In addition, Monash University and the Alfred Hospital are at the cutting edge of rehabilitation research and practice, particularly following brain and spinal injury and amputation, through the research of the Monash Epworth Rehabilitation Research Centre and the Caulfield Acquired Brain Injury Rehabilitation Centre.

## Evidence synthesis relating to veterans' health issues

The Australasian Cochrane Centre (directed by Professor Sally Green) provides training and support for authors conducting Cochrane systematic reviews and advocates for the use of evidence to underpin clinical practice, policy for government and industry, and international benchmarking. ISCRR also has research translation in regard to compensation, occupational health and safety, and rehabilitation as part of its research program.

### Studies of specific health issues affecting veterans

As well as health problems related to their military service and deployments, military personnel and veterans are subject to the health problems and concerns that are also found in the general population. Monash University also conducts research in relevant areas:

- Women's health (Centre for Women's Health, Directed by Professor Susan Davis)
  - Premenstrual syndrome
  - Management of menopause
  - Optimising treatment of breast cancer (ATLAS study; US military grant)

- Men's health (see also Men's health, Page 10)
  - Prostate disease, including prostate cancer
  - Testicular cancer
  - Male infertility
  - Use and abuse of testosterone treatments
  - Sexual dysfunction, including impotence
- Public health
  - Prevention and management of diabetes (with Baker IDI)
  - Obesity (with Baker IDI)
  - Hypertension and heart disease (with Baker IDI)
  - Stroke
  - Cancer
  - Allergies, asthma and respiratory diseases (Professor Robyn O'Hehir)
  - Mental health treatment and research (Monash Alfred Psychiatric Research Centre)

In relation to cancer and other major health problems, the School of Public Health and Preventive Medicine is a leading centre of registry science with existing registries for trauma, fractures, burns, cancers, blood transfusions and cardiac procedures. The William Buckland Radiotherapy Centre, Alfred Hospital is a leader in research and treatment using targeted radiotherapy for cancer, including prostate, lung, spinal and brain.



## Defence Health – Research

## Improving the management of trauma

As The Alfred is the hospital receiving the largest annual uptake of trauma patients in Australia (>5,500), considerable research has been conducted directed towards improving outcomes in these patients. The research has investigated interventions covering the entire time course from the point of injury (see top Page 6) to rehabilitation and recovery:

- Hyperbaric oxygen therapy in lower limb trauma randomised controlled trial (HOLTT)
- Comparison of outcomes following transfusion of freshest versus stored (standard care) whole blood in intensive care (TRANSFUSE randomised controlled trial)
- Neurotrauma and traumatic brain injury (including randomised controlled studies of decompressive craniectomy, erythropoietin and prophylactic hypothermia – POLAR)
- Treatment of severe burns
- Intensive care and anaesthesia
- Brain and spinal injury and amputee rehabilitation
- Brain repair following head injury, using new devices and bionics

The research is conducted within these centres:



- The Right Care, Right Time, Right Place: Improving outcomes for People with Spinal Cord Injury NHMRC Partnership Project
- NHMRC Centre of Research Excellence for Patient Blood Management in Critical Illness and Trauma
- Transfusion Outcomes Research Collaborative (TORC), a partnership with the Australian Red Cross Blood Service
- National Trauma Research Institute (NTRI)
- Victoria's Burns Centre
- Monash Epworth Rehabilitation Research Centre
- Caulfield Acquired Brain Injury Rehabilitation Centre (under construction)
- Victorian Institute for Forensic Medicine

(see Database Management and Registry Science, Pages 10-11)

This research is supported by registries which enable outcomes to be documented and compared for different treatment modalities after short term and long term follow-up of several years to decades:

- Victorian State Trauma Outcomes Registry and Monitoring (VSTORM)
- Victorian Orthopaedic Trauma Outcomes Registry (VOTOR)
- Bi-National Australia and New Zealand Burns Registry (Bi-NBR)
- Massive Transfusion Registry (Australia and New Zealand)

In addition, work modelling the availability of blood supplies in various settings, including a conflict setting, is planned to be undertaken after Associate Professor Gambhir has been appointed (see top Page 3).



## Improving the emergency care provided by first responders

Ambulance Victoria is a world leader in pre-hospital research and in developing new techniques for the pre-hospital setting. Paramedics undergo basic training at Monash University and advanced training at The Alfred Hospital, which is also a centre for research in pre-hospital care, including:

- Rapid infusion of cold (4oC) normal saline by paramedics during cardiorespiratory resuscitation (RINSE)
- NHMRC Centre of Research Excellence in Australian Resuscitation Outcomes Consortium (Aus-ROC)

## Preventing accidents and chronic disease among service personnel

MonCOEH is the national leader in studies on health and safety in high risk occupations. Research conducted includes the following:

- Health of workers in the aluminium and petroleum industries
- Asbestos and cancer research, including the Australian Mesothelioma Registry
- Noise induced hearing loss and other chronic diseases
- National fire-fighter cohort study

In addition, MonCOEH undertook the research for the Victorian WorkHealth Program, involving promoting health in the workplace, including on-site health checks for cardiovascular disease and diabetes prevention. The School has also promoted exercise among work colleagues (10,000 steps program).

These expertise and methodology are relevant to the military context in two respects, first in relation to improving the safety of personnel and second regarding investigating possible causal associations between exposures during military engagements and health outcomes, including malignancies.

In addition, the Global Health and Society Unit conducts research and seminars on the promotion of health and wellbeing, the prevention and control of non-communicable conditions, and addictive behaviours.

## Preventing and treating mental illness among service personnel

Four arms of research in the mental health field pertinent to soldiers in training, on assignment or following deployment and conducted by the School of Psychology and Psychiatry and Monash Alfred Psychiatric Research Centre are:

- Fatigue and the impact of sleep disorders on cognition and occupational risk (CRC established February 2013; see below)
- Risky behaviour associated with alcohol and drug use
- Transcranial magnetic stimulation for depression and other mental illnesses
- Post-traumatic stress disorder

The Cooperative Research Centre (CRC) for Alertness, Safety and Productivity is developing and deploying the next generation of shift scheduling and workplace design techniques, alertness assessment devices, individualised programs for better sleep health, and a range of innovative strategies to reduce fatigue with the aim of improving alertness, performance and efficiency, and reducing workplace injuries.

In addition, Monash University is conducting research into gambling addiction and has links with the Turning Point Drug and Alcohol Centre.



## Preventing infectious diseases among service personnel

Research on infectious diseases is highly relevant to military medicine and the relevant projects conducted by staff at Monash University and the Alfred Hospital are:

- Health issues related to alternative water sources recycled water, rainwater and greywater
- Gastrointestinal pathogens in Australia
- Travel health risks and advice
- Infection prevention in the Australian hospital context

In addition:

- The Dean of the Faculty of Science at Monash University is a world leader in research into preventing dengue fever
- The Burnet Institute has unrivalled expertise and international connections in infectious disease, sexual and reproductive health and drug abuse, including how these affect developing nations. It also:
  - Develops diagnostic tools and other modalities which function
    in the field as opposed to in a well-equipped hospital.
  - Develops new vaccines
  - Conducts basic scientific work into malaria prevention



## Defence Health – Education

Monash University and Alfred Hospital have a large teaching program, including Master of Public Health (MPH) and training for medical doctors, as well as for specialist streams such as trauma, intensive care, cardiology and oncology, and for nurses, paramedics.

## Master of Public Health

In addition to the core MPH subjects of epidemiology, biostatistics, population health and research methods, current unit offerings pertinent to military health are:

- Chemical and biological hazards
- Occupational health and safety
- Infectious diseases: epidemiology and prevention
- Communicable diseases control in developing countries
- Public health in refugee camps
- Injury epidemiology and prevention
- Psychosocial work environment
- Alcohol and other drugs in society

The School has the capacity and expertise to add additional units to the MPH degree to address military health aspects not already covered.

It is now standard for units to be offered for students living remotely from the university, who may attend for a two-day teaching block and continue their study making use of online resources. By this means, students who are military staff can be based anywhere in the world and, provided they have time for study and access to the Internet, they can complete the unit requirements for their course.



## Practical training for clinical staff

A need identified by the Defence Health Service is for ongoing professional development of Health Service Officers, whether they be medical staff, nurses, dentists or paramedics. Staff at Monash University and The Alfred are engaged in training civilian personnel who work in these positions and are able to provide post-graduate training in many areas relevant to clinical personnel serving in the military context:

- Pre-hospital care for trauma patients
- Emergency and trauma treatment
- Treatment of severe burns
- Infectious disease prevention and treatment
- Management and treatment of patients with serious infectious disease
- Use of blood and blood products
- Use of hyperbaric therapy (with one of the world's most advanced hyperbaric facilities)
- Rehabilitation post trauma including brain and spinal injury and amputation
- Cardiovascular performance and exercise physiology
- Clinical simulation at a specially equipped centre



In addition, Monash University conducts the Certificate of Civil Aviation Medicine as an intensive 2-week short course. This unit is relevant to military as well as civil aviation. Monash University has also held a 2-week Defence Health Leadership Institute course for senior staff of Defence.

## Workforce development and management

The Defence Health Service has identified that the military workforce responsible for health service delivery have specialist needs for training and management. Monash University has expertise in health service management that could be deployed to assist the Defence Health Service in relation to these specialised needs.

## Capacity Relevant to both Defence and Veterans' Health

## **Men's Health**

Andrology Australia (The Australian Centre of Excellence in Male Reproductive Health, a legal entity of Monash University) operates nationally and brings together health and education experts from across Australia to develop materials and strategies to inform and advise health professionals and members of the public about male reproductive health disorders and other male-specific chronic diseases.

## **Health Economics**

The Monash University Centre for Health Economics has been at the forefront of health economics teaching and research in Australia for more than 19 years. The work of the Centre has included:

- Pioneering work on the construction of an instrument for the Assessment of Quality of Life;
- Application of research to priority setting in health care;
- Significant contributions to public policy in the areas of hospital funding, health insurance and health technology assessment;
- A major role in the development of policy and practice of economic evaluation for the Pharmaceutical Benefits and Medical Services Advisory Committees;
- Efficiency and performance measurement in health care organisations.

International recognition for the Centre has led to collaborations with institutions such as WHO, OECD, Harvard and Stanford Universities.

## **Health Policy**

Much of the research conducted at this centre has an impact on health policy. An example is the policy development conducted by The Transfusion Research Unit for the use of blood products at the state, national and international level:

- National standards and clinical practice guidelines in transfusion;
- Development and implementation of national and international haemovigilance, including monitoring for the emerging complications of transfusion;
- Promoting best practice in use of blood products locally (with Blood Matters program Victoria) and nationally (with the National Blood Authority);
- Working with the WHO's expert advisory panel on transfusion in relation to international transfusion policy, practice and guidelines.

## **Database Management and Registry Science**

The Monash University School of Public Health and Preventive Medicine (SPHPM) is a national leader in registry science, clinical informatics and data management and staff of the school are engaged in large scale projects from clinical registries to community based trials and major cohort studies. In relation to registry science, the School has conducted ground breaking work in registry design, ethics, privacy and legal issues, quality control and governance. SPHPM has the capability to comply with the ISO 27001 standard.

Several of the registries held by SPHPM are listed above (see Pages 4,5 and 6). The registries fall into three categories: clinical quality (monitoring quality of care, e.g. in the Intensive Care Unit setting); condition or disease registries; and drug or device registries. Efficacy and safety investigations can be conducted using these registries, and may involve seeking follow-up data from the point of care, clinical endpoints (using data linkage technology for both) or by contacting the individual patients.

In addition, the registry capability allows Australian health care practice to be benchmarked against international best practice.

To analyse and interpret the data generated by the research projects described in this document, high level biostatistical competence is required. SPHPM has a Biostatistics Unit of 10 staff which is part of the Biostatistics Collaboration of Australia. The Biostatistics Unit provides statistical advice on all of the projects conducted by SPHPM.

## Information resource relating to military and veterans' health

Staff of the centre have extensive links with public health units internationally. They can provide rapid access to high level expertise in most areas relevant to military and veterans' health.

## **Key Collaborators**

This research at Monash University and The Alfred Hospital is conducted in collaboration with national and international centres. Some established collaborations relevant to this capability statement are:

- Professor AC McFarlane AO, Head, Centre for Traumatic Stress Studies and Professor of Psychiatry, University of Adelaide
- Professor Michael Reid, Professor of Military, Medicine and Surgery, University of Queensland.
- Australian Centre for Posttraumatic Mental Health, University of Melbourne
- Australian Red Cross (in relation to blood product research)
- US agencies, including National Institute of Aging and National Institute of Cancer, within the National Institutes of Health
- Professor Andrew Maas, head of Euro Centre-TBI Program, Antwerp, Belgium.
- Uniformed Services University of the Health Sciences (USHUS), Bethesda, Maryland, USA; and Walter Reed Hospital and National Naval Hospital, Bethesda, Maryland, USA (direct links for MajGen J.V. Rosenfeld, Monash University).

## Key Personnel



### Professor Jeffrey Rosenfeld, Provisional Director

Email:J.Rosenfeld@alfred.org.auTelephone:03 9903 0190

A Major General and military surgeon whose current appointment is as Head, Division of Clinical Sciences and Department of Surgery, Central Clinical School, Monash University. His previous appointment was as Surgeon General ADF (Reserves) and he is currently Adjunct Professor at both the Department of Surgery, Uniformed Services University, Bethesda, Maryland, USA and the Centre for Military and Veterans' Health, University of Queensland, and Chair of the Defence Human Research Ethics Committee.



#### **Professor John McNeil**

Email:john.mcneil@monash.eduTelephone:03 9903 0565

Head of the School of Public Health and Preventive Medicine and of the Department of Epidemiology and Preventive Medicine and is Principal Australian Investigator of the ASPREE study.



### **Professor Malcolm Sim**

Email:malcolm.sim@monash.eduTelephone:03 9903 0582

Director of the Monash Centre for Occupational and Environmental Health, who has been Principal Investigator for several health studies of veterans, including Gulf War and Korean veterans.



### **Professor Peter Cameron**

Email:peter.cameron@monash.eduTelephone:03 9903 0581

Head of the Prehospital, Emergency and Trauma group within SPHPM and Academic Director of the Emergency and Trauma Centre, The Alfred Hospital, Head of the Victorian State Trauma Registry and Associate Director of the National Trauma Research Institute.



#### **Professor Jamie Cooper**

Email:jamie.cooper@monash.eduTelephone:03 9903 0931

Director, Centre of Research Excellence for Patient Blood Management in Critical Illness and Trauma (Blood-CRE), and of Critical Care Research, SPHPM and Head of Intensive Care Unit Research at The Alfred Hospital.



### **Professor Belinda Gabbe**

Email:belinda.gabbe@monash.eduTelephone:03 9903 0951

Head of the Emergency and Trauma Research Unit, and Chief Investigator of the Victorian State Trauma Registry, Victorian Orthopaedic Trauma Outcomes Registry, and the Bi-National Burns Registry.



### Professor Russell Gruen

Email:russell.gruen@monash.eduTelephone:03 9076 2561

Director of the National Trauma Research Institute (NTRI), a general and trauma surgeon at The Alfred, and Professor of Surgery and Public Health at Monash University.



### Professor Jayashri Kulkarni

Email:jayashri.kulkarni@monash.eduTelephone:03 9076 6924

Professor of Psychiatry, and Director of the Monash Alfred Psychiatry Research Centre (MAPrc). The Centre is one of the largest in Australia, and is dedicated to discovering new treatments, new understanding and new services for people with a range of mental illnesses.



### Professor Sharon Lewin

Email:Sharon.lewin@monash.eduTelephone:03 9076 3087

Head of the Department of Infectious Diseases, Central Clinical School, Monash University, Head of the Infectious Diseases Unit at The Alfred Hospital, Co-head of the Centre for Biomedical Research, Burnet Institute, and an international leader in HIV research.



### **Professor Andrew Forbes**

Email:andrew.forbes@monash.eduTelephone:03 9903 0580

The Department of Epidemiology and Preventive Medicine has a very strong biostatistics unit which ensures that all of its studies are conducted with a high standard of statistical rigour. Professor Forbes is the head of this unit and is a chief investigator on numerous research projects, including some with researchers external to Monash University.



### **Professor Just Stoelwinder**

Email:just.stoelwinder@monash.eduTelephone:03 9903 0378

Head of Health Services Management and Global Health Research. He has been the foundation chief executive of a number of major health services including Monash Medical Centre and Southern (now Monash) Health. He chairs the Board of Ambulance Victoria.



### **Dr David Newman**

Email:enquiries.epidemiology@monash.eduTelephone:03 9903 0555

Head of the Aviation Medicine Unit and Coordinator of the Australian Certificate of Civil Aviation Medicine. Dr Newman spent over 12 years in the RAAF as a medical officer and aviation medicine specialist, flying 150 hours in high performance aircraft such as the F/A-18. He continues as an active pilot.



