Combat medicine and blood preservation

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| intensive care,onthejobs,onthepods

James sits down with Brigadier Michael Reade from the Australian Defence Force (ADF) to discuss combat medicine and blood preservation. Above all, Brigadier Reade has a wide range of expertise and experience in this area. His ambition is to establish the ADF as a major contributor to military trauma research and to ensure the ADF's policies, training and equipment lead world best-practice.

In this podcast, you will learn more about combat medicine and the interesting and varied career options in the Defence Force.

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Brigadier Reade holds the following positions:

- **Australian Defence Force Professor of Military Medicine and Surgery, Joint Health Command,**
- **Assistant Surgeon General – Army,**
- **Director of General Health Reserve-Army, and**
- **Specialist Anaesthetist and Intensive Care Physician.**

About Brigadier Michael Reade

Michael is the inaugural ADF Professor of Military Medicine and Surgery. This is a Defence-Industry co-operation position established in 2011 as part of a programme to increase the number of senior specialist doctors in the permanent ADF.

In addition, Michael is anaesthetist and intensive care physician. Also, he holds a clinical appointment at the Royal Brisbane and Women's Hospital. Moreover, he has military appointments at Joint Health Command and Army Headquarters. Finally, Michael also holds an academic position as a Professor at the University of Queensland.

Brigadier Reade has first-class honours degrees in medicine and science from the University of Sydney. Additionally, he has a Doctorate of Philosophy in clinical molecular biology from the University of Oxford, UK. Finally, he has a Masters in Public Health, in statistics and clinical trials, from the University of Pittsburgh, USA.

Michael's contribution to the practice of intensive care medicine was recognised in 2017 with a Higher Doctorate from the University of Sydney. And in 2018, he received a Fellowship of the Royal Institution of Australia. He holds subspecialist qualifications in disaster management and aeromedical retrieval as part of his combat medicine expertise. His specialist clinical training began at Royal North Shore Hospital in Sydney.

Then, the John Radcliffe Hospital in Oxford, the Austin Hospital in Melbourne, and University of Pittsburgh Medical Center. Also, during his leave from the ADF, Michael worked as an attending critical care physician in Pittsburgh for 18 months.

Military history

Brigadier Reade was commissioned as a Reserve General Service Officer in 1990 through Sydney University Regiment. As a result, he received a Prince of Wales Award. Hence, he commanded a platoon of US Regular Army soldiers of the 2nd Armoured Division during their National Training Center rotation at Fort Irwin, CA. In 1995-1996, he was a project officer at the Reserve Staff Group. There, he analysed the employment of reserve medical personnel. In 1996 Michael completed medical studies and was posted as Regimental Medical Officer and instructor, University of NSW Regiment 1996-1997. This is where his journey in combat medicine began. And subsequently Sydney University Regiment 1997-1999. From 2000-2004, he was studying in Oxford. Whilst he was there, he was posted to 144 Parachute Medical Squadron RAMC(V).

When he returned from the UK he was a specialist anaesthetist in the Parachute Surgical Team of the 1st Health Support Battalion. He settled in Melbourne in 2007 and he became the OC Clinical Advisory Group, 3rd Health Support Battalion. Further, Michale is a graduate of the Logistic Officer and Land Warfare Centre Staff Officer series of courses. In addition, he also holds the British Army-sponsored diploma in conflict medicine. He has deployed to Bosnia and Kosovo on attachment to the British Airborne Brigade. He has also deployed to East Timor and the Solomon Islands.

NATO and ADF hospitals

In 2009, he was the clinical director of the NATO hospital, Tarin Kot, in Afghanistan. In 2013, he commanded the Australian contingent at the NATO Role 3 Hospital, Kandahar, in Afghanistan. He received a JTF633 Silver Commendation for this. In 2015, he established the ADF's Role 2E hospital in support of Operation OKRA in Iraq. During this deployment, he received the US Army Commendation Medal for leadership and direct intervention during a life-threatening incident involving a US soldier. He deployed to Iraq again in both 2016 and 2017.

From 2015 to 2018 he was the Director of Clinical Services of the 2nd General Health Battalion. This is the Australian Regular Army's only field hospital. In 2017, he led this unit to become the first-ever ADF hospital accredited by the Royal Australasian College of Surgeons Trauma Verification Program. As a result, he became a Member of the Military Division of the Order of Australia in the 2019 Queen's Birthday Honours List.

In 2019, he was appointed the Assistant Surgeon General – Army. In this role, he is responsible for the technical governance of the specialist clinical personnel in the Australian Army, and for health capability development.

Research interests and instructing

Brigadier Reade's research interests are:

- **fluid resuscitation and coagulopathy in trauma,**
- **blood transfusion,**
- **management of acute cognitive dysfunction, and**
- **the design of trauma systems.**

Michael also leads a programme of research investigating cryopreserved blood products. These technologies hold equal promise to the ADF and rural Australian civilian communities. He has published over 150 papers, delivered more than 300 lectures, and secured over A$22 million in grant funding.

Michael has led ADF guideline development in anaesthesia and blood transfusion. He was the Senior Observer-Trainer for the major 2nd General Health Battalion exercises in 2012-2014. In addition, Michael represents the ADF on the Australian Resuscitation Council, for which he has written three national guidelines. He supervises 12 ADF and civilian postgraduate research students. And he mentors the ADF's full-time clinical medical trainees. In 2013-14, he was the Chief Instructor on all OP SLIPPER pre-deployment clinical specialist training. He is the Chief Instructor on the ADF Military Anaesthesia course.

Michael's wife Kathryn is a registered nurse. Together, they have one daughter who is in primary school. He looks forward to returning to rowing and flying General Aviation aircraft whenever time allows.

Brigadier Michael Reade AM MBBS BSc DMedSc Sydney MPH Pitt DPhil Oxford DMCC DIMCRCSEd AFRACMA FCCM FANZCA FCICM.

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With Brigadier Michael Reade, Australian Defence Force Professor of Military Medicine and Surgery, Assistant Surgeon General – Army, Director of General Health Reserve – Army and Specialist anaesthetist and intensive care physician.

Introduction

James sits down with Brigadier Michael Reade to discuss his experiences in the Australian Defence Force (ADF). Specifically, they cover the past and future of combat medicine as well as the current advances into innovative blood preservation research. We also gain insight into the opportunities the ADF provides for a medical professional.

1. Why did you decide to join the defence force?

- **I joined as a first-year medical student at the University of Sydney for variety of experience and to belong to a community that was bigger than just the student cohort.**
- **The Defence Force has also allowed me to practice in a different way to that of a hospital doctor.**

2. Tell us about your career.

- I completed my degrees over a period of 7 years at the University of Sydney
- While completing my degree – I was a General Service Officer in Australian Army Reserves.
- Following completion of degree – I worked as a Battalion Regimental Medical Officer for Army Reserve unit through my junior years and specialist anaesthetist and intensivist training.
- I completed my PhD in the UK. During this time I was deployed to Bosnia and Kosovo with the British Airborne Brigade.
- I returned to Australia and completed a few deployments as a specialist anaesthetist in Army field hospitals.
- Since then I have held positions as Director of Clinical Services – General Health Battalion and the ADF Professor of Military Medicine and Surgery

3. What sort of career opportunities has the Australian Defence Force presented?

- The ADF has allowed me to practice in a civilian and military capacity at once.
- I have been in command of multiple international troops and have had the opportunity to work in and command multiple field hospitals in various combat zones.
- My training has allowed me to work in clinical, technical and managerial roles in these field hospital environments.
- My career highlights include:
    - Working as the commander of Australian contingent in Kandahar, Afghanistan in 2013
    - Director of Clinical Services of the regular Army's deployable hospital.

4. What opportunities are there for medical professionals who wish to join the ADF? Who should one speak to if they are interested?

- Working as a Medical Officer in the Defence Force provides variety of experience, including medicine common in civilian environments as well as trauma.
- The ADF offers you the ability to step up into a leadership/ managerial role in addition to practicing clinical medicine.
- The best people to speak to would be the Defence Force recruitment team. They provide lots of information regarding the logistics of service and training within the ADF.
- Discussing with peers and those slightly senior to you will often be the best resource to get a truthful representation of life in the ADF.

5. What is combat medicine?

- Combat medicine is practiced in challenging environments often dealing with pathologies and treatment frameworks that are uncommon or non-existent in civilian medicine.
    - These include areas such as blast or ballistic trauma and chemical, biological or radiological warfare.
- Presentations can range from those seeking assistance for their primary care issues through to severe trauma and injury that must be managed on site.
- The challenge lies in providing the best possible care, within the resources available.

6. What have been the significant changes in combat medicine over the years?

- Previously, it was accepted that the standard of care is likely to be lower in the combat environment.
- The key shift over the last few years has been the efforts that have been put into developing skills and technologies to enable to delivery of a high standard of healthcare in the combat environment.
- Clinical trials and technological innovation have meant there have been significant advances in combat medicine – all of which are evidence based and have been proven to improve patient outcomes in the field.
- Additionally, healthcare innovations developed to manage trauma in combat situations in Afghanistan or Iraq, have now been recognised and incorporated into the management of trauma cases in civilian medicine also.

7. The ADF has been working with the Lifeblood (previously Red Cross Blood Service) and the National Blood Authority since 2010 to facilitate the delivery of frozen blood products to remote and austere environments. Can you tell us about this research and the significant learnings for the ADF?

- Frozen red blood cells
    - Frozen at – 80 degrees in glycerol as cryopreservative. These then undergo deglycerolisation to enable them to be transfused.
    - These processes have been adapted from practices seen at Dutch field hospitals in Iraq.

- Frozen platelets
    - The surface of platelets plays an important role in the coagulation cascade, through the involvement of many enzymes and cell surface receptors.
    - Currently there is minimal evidence to support the use of frozen platelets when alternatives are available.
    - If there is no alternative, then the use of frozen platelets should be considered.
- Current projects
    - A pilot study, across four hospitals in Australia, has enabled NHMRC funding to be provided to conduct a definitive study looking at the utility of frozen platelets.
    - This study will be conducted through 12 civilian hospitals across the country and the first patients are due to be recruited in early 2020.
    - Depending on the progress of the study, frozen platelets may be available for use within civilian hospitals within the next 2-3 years.
    - Following this, frozen platelets will also be available for use by the Australian military.
    - There is some existing evidence to show that there is mortality benefit in the use of higher ratios of platelets in comparison to plasma in the combat environment. The current research group is looking to verify and strengthen such evidence to support the use of platelets optimally.
    - The research group is also looking into where such a product may be useful in Australia:
        - Larger hospitals with alternative platelet supplies and smaller hospitals where platelets transfusions are not routine will not be candidates to have frozen platelets.
        - Hospitals that fit in between these two categories could likely benefit from a frozen platelet blood bank and current research is being conducted to identify suitable candidates.

8. The role of the Australian Defence Force in contributing to military medical research.

- The United States of America, Canada and the United Kingdom have contributed a significant amount of research within the realm of military healthcare.
- Australia has a strong health care research sector in civilian medicine, and it is the aim of Brigadier Reade to facilitate the publishing of military healthcare research from Australia in the global sphere.
- Many fruitful partnerships exist between the Australian Defence Force and numerous research centres and it is priority to get this work out into the international research scene.

9. What is the future of combat medicine?

- Technological advances and new drugs are constantly being developed to aid the delivery of healthcare in combat zones.
- Establishing a strong evidence base for the use of various blood products in combat continues to be an area of importance.
- Improving systems and procedures remains the key to delivering a high standard of care in combat medicine.
    - Analysing data related to severity adjusted case fatality rates may help identify populations and areas where trauma systems may be sub-optimal.
    - These areas can then be targeted to improve systems and procedures to improve patient outcomes.

10. What would you say to young doctors considering a career in the defence forces?

- There can occasionally be domestic and international commitments that may take you away from both places and people in your life but a career in the defence force can be extremely fulfilling.
- Similar to working in a civilian hospital there are some challenges that come with a career in the defence force however a career in the ADF is extremely rewarding.
- Talk to your peers and those slightly more senior to you who are in the field – They will provide an invaluable account of lived experience and this is the most valuable when considering ADF careers.

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