

Achievements Report 2022-2025



Vision

Furthering healthcare excellence in remote and extreme environments.



Mission

CARMM is a leader and partner of choice in Healthcare in Remote and Extreme Environments (HREE) in Australia and internationally.

PARTNERS



Achievements Snapshot

- CARMM is Australia's network of experts in Antarctic, Remote, Space and Extreme Medicine.
- CARMM operating model has become a blueprint for other multi-agency collaborations, such as the Centre of Science and Technology (CAST).
- CARMM Governance documentation have been updated including, MOU, CARMM Council Terms of Reference, Strategic Plan and Communications Strategy.w

Clinical					
Achievement	Contributing CARMM Partners				
	Australian Antarctic Division	University of Tasmania	Department of State Growth	Tasmanian Health Service	Department of Health
Provide comprehensive medical services and support for the Australian Antarctic Program (AAP) and related programs operating in Antarctic, Southern Ocean, extreme and remote areas	●			●	●
Development of hyper/hypobaric chamber and Department of Diving, Hyperbaric and Aerospace Medicine at the Royal Hobart Hospital, which is unique in the Southern Hemisphere			●	●	
Bilateral Agreement Department of Health and Australian Antarctic Division supporting training and delivery of healthcare in Australia's Antarctic Program and related programs	●			●	●

Education					
Achievement	Contributing CARMM Partners				
	Australian Antarctic Division	University of Tasmania	Department of State Growth	Tasmanian Health Service	Department of Health
Major Course review and enhanced support of HREE accredited education pathways	●	●			●
Development of Humans in Space Course as a key Hobart-based annual Space medicine event	●	●	●		

Vocational Training					
Achievement	Contributing CARMM Partners				
	Australian Antarctic Division	University of Tasmania	Department of State Growth	Tasmanian Health Service	Department of Health
Establishment of the Tasmanian Rural Generalist Pathway Coordination Unit, with CARMM council providing governance oversight	●	●		●	●
Australian College of Rural and Remote Medicine Accredited Registrar Training Post	●				
Successful Recruitment of Antarctic Medical Practitioners	●				

Research and Innovation					
Achievement	Contributing CARMM Partners				
	Australian Antarctic Division	University of Tasmania	Department of State Growth	Tasmanian Health Service	Department of Health
Collaboration and modelling for development of National Australian Health Research Institute for Space and Extreme Environments (AHRISSE)	●	●	●		
Research in human biology, psychology and physiology in Antarctica, remote and extreme environments.	●	●		●	●
NASA funded Translational Research Institute for Space Health (TRISH) research collaboration	●				

Achievements in Depth

CLINICAL

Provide comprehensive medical services and support for the Australian Antarctic Program (AAP) and related programs operating in Antarctic, Southern Ocean, extreme and remote areas

CARMM delivers comprehensive healthcare services and support for the AAP, as well as other organisations operating in Antarctic, Southern Ocean and Remote medical environments.

Medical care at Australia's Antarctic and sub-Antarctic research stations is delivered by a single doctor, with no ability to evacuate people for up to 9 months a year. This requires AAP doctors to be skilled as Rural Generalists, ensuring they can provide comprehensive healthcare across a range of specialty areas such as anaesthetics, surgery and dentistry.

A key part of the AAP medical model is the support provided by CARMM partners with medical specialists available through the CARMM and the Tasmanian Department of Health and Tasmanian Health Service for advanced clinical and telehealth advice available 24/7, 365 days a year. This specialist support was critical to the telemedicine specialist care across the winter months of an expeditioner supporting the lone station Antarctic Medical Practitioner.

This resulted in a successful winter medevac of the expeditioner at Australia's Casey station in 2023.

A team of 5 health professionals from CARMM led by the Polar Medicine Unit's Dr Catherine Oermann augmented with an emergency doctor and nurse from the Royal Hobart Hospital, provided helicopter medical retrieval from Casey Station to the ship parked in the ice and shipboard medical care on return to Hobart through the Southern Ocean. This long-range medevac capability by air and sea, is an important healthcare option for remote, maritime and Antarctic settings.

Development of hyper/hypobaric chamber and Department of Diving, Hyperbaric and Aerospace Medicine at the Royal Hobart Hospital

CARMM partner, the Tasmanian Health Service, installed a new hyper/hypobaric chamber at the Royal Hobart Hospital (RHH) as part of the RHH Redevelopment, the core capability of its Department of Diving, Hyperbaric and Aerospace Medicine. The state-of-the-art dual-capability chamber is unique in the Southern Hemisphere, and one of only a handful globally that can both pressurise (hyperbaric) and depressurise (hypobaric).

The chamber delivers hyperbaric oxygen treatment (HBOT) for decompression illness, commonly known as "the bends", in commercial and recreational diving industries. HBOT is also used to treat patients with other medical conditions such as diabetic ulcers, radiation tissue injuries and life-threatening infections.



The chamber is also fitted with a hypobaric depressurisation capability. This simulates altitude and can be used for research on the effects of high altitude on the body, in particular low oxygen levels and low ambient air pressure. This is particularly useful for research and training in the aerospace sector.

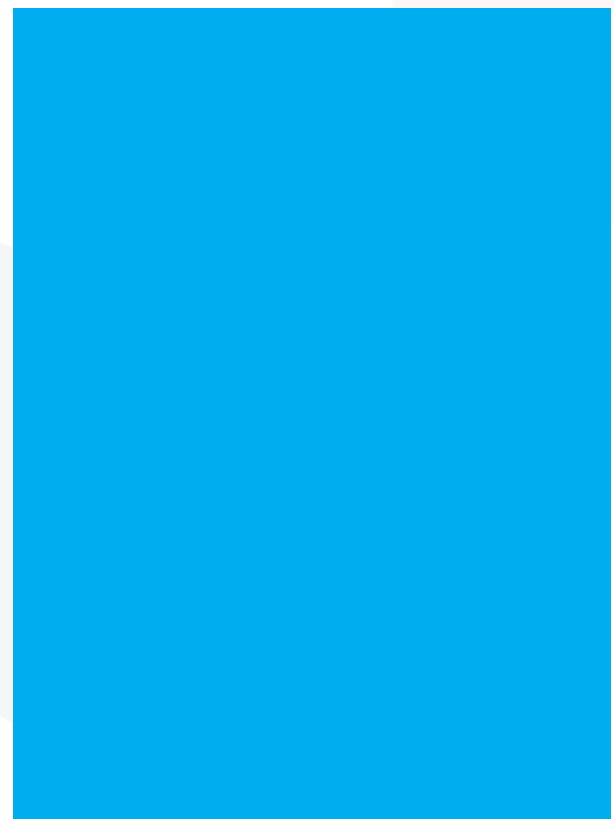
The Department's research is undertaken under the umbrella of the PEGASUS (Physiology of Extreme Geographic, Aviation, Space & Under-Sea Environments Laboratory) EnviroLab. PEGASUS research aims to further understand the human physiological response to extreme environments and translate these lessons to mainstream medical practice for the benefit of all Australians.

Bilateral Agreement Department of Health and Australian Antarctic Division supporting training and delivery of healthcare in Australia's Antarctic Program and related programs

This key CARMM agreement facilitates health services and training provided by the Tasmanian Government to the Australian Antarctic Division. This is a longstanding agreement since 1983, has now been renewed, providing access to specialist medical services, dental, allied health, pharmacy and paramedicine.

This agreement is critical in supporting the health and well-being of the Australian Antarctic Program participants through the Polar Medicine Unit. Medical Specialists, Nurses and paramedics have been

seconded and deployed within the AAP and to Antarctica to support specific healthcare needs and reviews. It provides world leading telemedicine and Antarctic medical scope of practice.



EDUCATION

Major Course review and enhanced support of HREE accredited education pathways

CARMM partner, the University of Tasmania, has developed with CARMM expertise accredited training and education pathways for those seeking to specialise or upskill in Healthcare in Remote and Extreme Environments. The HREE program provides a 'one-stop shop' to up-skill medical and other health professionals for care-giving in remote areas. The postgraduate academic pathways range from short course through to graduate certificate, diploma and Masters and PhD level awards.

Antarctic doctors complete several courses prior to deployment including the Expedition Medicine 8-day course, Medicine in Extreme Environments, Procedural Skills in Abdominal Surgery, Regional Anaesthesia and Emergency Dentistry. These are a crucial part of the 'AAD Visible Training pathway' for Antarctic Medical Practitioners.

In 2024, UTAS initiated an external major course review of the HREE suite of courses to ensure they were of the highest academic standard and were able to support ongoing growth. The course panel noted the unique innovative nature of the courses and the program's ability to capitalise on the proximity of the University to Antarctica and the Tasmanian wilderness; and its provision of critical gateway training for doctors and other health professionals to work in these extreme environments.

Recommendations from the review included expanding the entry to include relevant non-medical healthcare professionals, and retaining clear specialisations (expedition medicine and space medicine) at the Graduate Diploma and Masters level. Recommendations have been implemented and the HREE courses are highly sought after, with increasing demand experienced for the 2025 intake.

The AAD's Deputy Chief Medical Officer Dr John Cherry is the first PhD candidate in this speciality area, researching "Antarctica as a Space Analog for Management of Medical Emergencies" (see Case Study).

Development of Humans in Space Course as a key Hobart-based annual Space Medicine event

Aerospace medicine is a growing sub-specialty of medicine in the HREE stream. This course was developed under the CARMM banner and in collaboration with the Australasian Society of Aerospace Medicine (ASAM).

The Humans in Space Course has been developed and is delivered by an international and Australian faculty including Dr Bob Thirsk (retired Canadian Astronaut). It focuses on the environmental challenges and technological adaptations for survival in space. It also explores the physiological and patho-physiological responses of humans in space and applies principles of space analogue research to inform the development of solutions to long-term space travel.

VOCATIONAL TRAINING

Establishment of the Tasmanian Rural Generalist Pathway Coordination Unit, with CARMM council providing governance oversight

CARMM partner, the Department of Health, has established a Tasmanian Rural Generalist Pathway (TRGP) Coordination Unit to attract and upskill junior doctors to become Rural Generalists (RG) in the state.

A RG is a medical practitioner trained to meet the health care needs of Australian rural and remote communities. RGs provide primary care, emergency care and at least one other area of medical specialist care in hospital and/or community setting. It takes about five years of post-graduate training to become an independent RG.

There is now an annual Tasmanian Rural Health Conference held in May, providing an opportunity to recruit, upskill and attract people to the RG speciality. The Single Employer Model Supervision Scholarship Program has also been established where general practitioner (GP) registrars have the option to be employed by the Tasmanian Health Service (THS) while undertaking their general practice training.

Australian College of Rural and Remote Medicine Accredited Registrar Training Post

CARMM partner, the Australian Antarctic Division, provides mentorship, supervision and training posts for Australian College of Rural and Remote Medicine (ACRRM) registrars and trainees.

AAD has been re-accredited as a training post for ACRRM Core Generalist Training (CGT) and Remote Medicine Advanced Specialist Training (AST). Training is supported by face-to-face intensive training in Tasmania prior to departure for Antarctic and sub Antarctic Stations, and remote telehealth enabled education, 24/7 support and supervision at remote sites.

Successful Recruitment of Antarctic Medical Practitioners

CARMM's education and vocational training pathways have led to a direct increase in skilled applicants applying to be Antarctic Medical Practitioners who then go on to serve rural, regional and remote Australia.

In 2007, the AAD was considering closing a station due to a lack of suitable doctors. Now the positions are highly sought after and competitive with 50-60 Medical Practitioners apply to work in Antarctica each recruitment round, with a shortlist of 10-12 highly suitable applicants. Many of the doctors have undertaken, or are seeking to undertake, CARMM HREE academic units and short courses to improve their merit standing. Unsuccessful candidates are referred to CARMM, ACRRM and UTAS academic offerings as ways to improve competitiveness in future applications.

After their time with the AAD and completion of training, these Antarctic Medical Practitioners go on to become Fellows of the Australian College of Rural and Remote Medicine (FACRRM) and are often the most sought after and employable rural and remote generalist doctors.

RESEARCH AND INNOVATION

Collaboration and modelling for development of National Australian Health Research Institute for Space and Extreme Environments (AHRISSE)

CARMM was tasked by the newly formed Australian Space Agency to develop a model for a human research institute, in the National interest, that builds on the unique capabilities of CARMM partners and Tasmanian space medicine and life sciences.

This model provides much needed opportunity and leadership for Australia's engagement with space agencies and coordination of Australian space medicine and life sciences, education, research and innovation supporting Australian human spaceflight aspirations.

Research in human biology, psychology and physiology in Antarctica, remote and extreme environments

CARMM partners have undertaken innovative research projects looking at the impact of remote and extreme environments on human health.

Some key studies include the development and testing of remote ultrasound imaging protocols to assess if novice ultrasound users can generate clinically useful images, the use of 3D optical scanning technology to assess changes in body morphology, wearable biosensor testing in the Antarctic deep field and assessment of changes in cognition over an Antarctic winter.

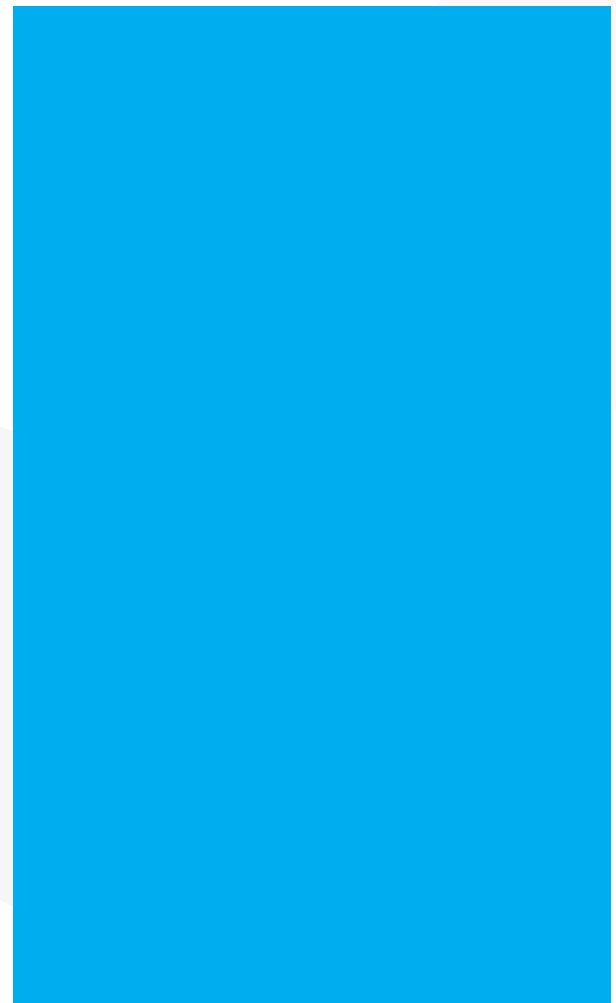
The international Antarctic Medicine Community, coordinated through the Scientific Committee of Antarctic Research and Council of Managers of National Antarctic Programs Joint Expert Group of Human Biology and Medicine (SCAR COMNAP JEGHBM), has also shown particular interest in CARMM research, collaboration, training and support of Antarctic Medical practitioners.

NASA funded Translational Research Institute for Space Health (TRISH) research collaboration

The NASA funded Translational Research Institute for Space Health (TRISH), of the Baylor College of Health and Medicine, was launched in November 2023. CARMM is working with TRISH to undertake research and develop technologies utilising the Australian Antarctic setting as a space analogue. It's envisaged the outcome of this work will help inform how to keep astronauts safe and healthy on long duration exploratory space missions to the Moon and Mars.

Last year this research collaboration saw astronauts orbiting Earth on the Polaris Dawn mission, undertaking a range of research to better understand the effects of long-duration spaceflight on human health. At the same time as the experiments were being conducted in space, expeditioners and doctors at Australia's Antarctic and sub-Antarctic research stations acted as the ground analogue and collected data utilising frontier medical technology with hand held portable ultrasound to make clinical imaging assessments and 3D Optical body scanning technology to determine body morphology.

Given the prolonged isolation of up to 9 months, relatively small teams, dependant on technology for survival, Australia's Antarctic Program is an excellent analogue for understanding the risks to humans in space, and for testing and developing technologies and methodologies to reduce risks to long duration exploratory space missions. Advanced technology and lessons learnt in Antarctica and Space can then be translated to improve healthcare in remote communities on Earth.



Case Study

DR JOHN CHERRY

Remote and extreme environments offer interesting challenges and great opportunities for research. This type of research can have far reaching applications, from remote Antarctica to outer space, and one such researcher who is taking up the challenge is Dr. John Cherry.

John is the Deputy Chief Medical Officer at the Australian Antarctic Division with experience as an Antarctic Medical Practitioner at Davis and Casey research stations and the Antarctic deep field. He also has experience as a Field Leader, where he recently led a team 1200km into the Antarctic deep field to support the Million Year Ice Core project.

John is also working on his PhD on "Antarctica as a Space Analogue for Management of Medical Emergencies", which is supervised by CARMM partners Professor Graeme Zosky (University of Tasmania), Dr Jeff Ayton (Australian Antarctic Division) and Associate Professor David Cooper (Tasmanian Health Service). Although Antarctica and space medicine seem to be very different, they share similar challenges in their remoteness and their use of technology to provide excellent medical care; this is a theme John is exploring in his research.

John has a strong background in remote medicine, having completed a Masters of Healthcare in Remote and Extreme Environments at the University of Tasmania in 2021. At the same time, he was training in rural General Practice and Emergency Medicine through the Australian College of Rural and Remote Medicine, and the Australasian College for Emergency Medicine.

John's first trip to Antarctica sparked a passion for extreme environments and a chance meeting with a doctor during the expedition led him on a path to medicine. Before studying medicine, John worked as an astrophysicist, high school teacher, helicopter pilot and expedition leader. Since entering the medical field, he has worked for NASA and the European Space Agency developing medical training programs for astronauts and supporting the development of a mission to Mars. John has recently brought this experience to his role as Vice-President of the Australasian Society of Aerospace Medicine and Senior Lecturer in Space Medicine at the University of Tasmania where he is working to support the growing space medicine community in Australia.

With the perfect suite of skills and knowledge of medicine in remote and extreme environments, John will pave the way to a greater understanding of high-quality health care delivery in challenging conditions.

Case Study

DR ROB DICKSON

Dr Rob Dickson has established himself as a Rural Generalist in Tasmania through his experiences training and working with Australian College of Rural and Remote Medicine (ACRRM) and CARMM partners.

Rob's decision to pursue ACRRM rural generalist training stemmed from his deeply fulfilling personal and professional experience at Casey Station and the clinical confidence afforded by the AAD's remote support and training model. He was also mentored and encouraged by the late Dr Dennis Pashen at Queenstown and Dr Jeff Ayton, both past presidents of ACRRM.

After achieving his Fellowship with ACRRM in 2020, he spent two more summers at Casey, including supporting a deep field traverse on the Antarctic plateau. Rob then wintered at Macquarie Island in 2021 as the only doctor on station. Rob was ready (if needed) to perform the roles of surgeon, anaesthetist, physiotherapist, pharmacist, radiographer, dentist and counsellor for the remote community.

Rob has also achieved a Graduate Diploma in Healthcare in Remote and Extreme Environments (HREE) through the University of Tasmania. He has since continued his involvement with the HREE program with lecturing, course facilitation and unit coordination. Rob also serves as a Medical Educator for ACRRM, assisting growing cohorts of Rural Generalist registrars through their training requirements.

Dr Rob Dickson was awarded Rural Doctors Association of Tasmania 2021 Doctor-in-Training for the Year. This highlights the importance of the now formalised Tasmanian Rural Generalist Program to support Tasmanian regional and remote communities directly serving community need with the right doctors, with right training and the right skills

Currently Rob works a mix of general practice and acute care with the Tasmanian Department of Health and the Australian Antarctic Division Polar Medicine Unit.

Rob initially relocated to Tasmania in 2018 to work with the Australian Antarctic Division, spending a summer as doctor at Casey Research Station. After a successful deployment, he chose to formalise his clinical training through ACRRM, which saw Rob based in the challenging yet rewarding, clinical environment of Queenstown on Tasmania's west coast.

