and to develop tools for clinicians and coaches to simplify data capture, analysis and interpretation. Exceptional experience in developing technology including telehealth to analyse human movement. Examples of Oren's work include the development of textile sensor sock to measure plantar pressure, motion sensors with biofeedback application to reduce stress fracture, development of GaitaBase and PromsBase web repository systems for gait analysis and patient reporting outcome measures, and tele-assessment platform to measure balance and functional performance.

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Strategic Health Impacts of Climate Change on ADF Personnel and Operations Throughout Australia and the Pacific

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Abstract

Climate change has now been declared the most significant health threat of the 21st century. Simultaneously it is being assessed as the most significant threat multiplier of the modern era. As increasingly dire warnings detail the rapidly contracting window to address future impacts, current research indicates that climate change is already having significant and escalating, detrimental effects. At the nexus of climate change, global health, and national security, these effects are generating increased risk to socio-political and economic stability through negative individual and population health outcomes. The resulting strategic impact will have both direct and indirect ramifications for Australian Defence Force (ADF) personnel and the nature of current and future operations. National security organisations seek to anticipate and mitigate risks to stability and prosperity through strategic assessments of relevant geopolitical, environmental, and socio-demographic information. Integration of climate change as a fundamental planning consideration will enable accurate assessment of climate effects on the regional operating environment and future ADF capability. Inherent in this capability assessment are climate related health impacts on personnel and operational sustainability required to achieve the long-term national security agenda.

Initial phases of the current research clarified how climate related health impacts on personnel and operations can be conceptualised across three key areas. Disease migration presents a direct risk to personnel, the broader Australian population, and through human and vector cross border migration throughout the Pacific region. Food and water security presents a direct risk to Pacific Island populations and an indirect and escalating risk to regional stability through challengers to basic living conditions. Extreme weather events of both acute types, such as cyclonic event, and chronic types, such as protracted heat wave and associated drought, produce cascade climate effects. These primary, secondary, and tertiary cascade effects have myriad direct and indirect health impacts in individuals and populations across both civilian and military demographics. Climate related health impacts will escalate personnel protection requirements on training and deployments, which will further be exacerbated by operational tempo in support of defence aid to the civil community and humanitarian aid and disaster relief. Manning of contingency force elements throughout high-risk weather season represents a pre-emptive response this demand which will increase tempo, demand on personnel, and risk to climate related health exposure in addition to conventional military roles.

To advance understanding of this interdisciplinary nexus of climate related strategic health impacts, the current research is employing system dynamic modelling as an iterative approach to align research conclusions with assumption-based planning methods. The approach demonstrates robust potential for both strategic and operational planning through increasing granularity as analysis transitions from broad scale qualitative deductions towards specific detailed required in qualitative impact and risk assessments required for mission planning. Whilst still in the formative stages, this body of work seeks to build on a systematic review of climate related health impacts to personnel and operations throughout Australia and the Pacific. This will result in an iterative framework, using system dynamic modelling, to analyse specific impacts as they apply to strategic risk. In full, the work seeks to align research outcomes advising on the growing risk of climate related health impacts with useful inputs to Australia's long-term strategic agenda.

Biography

CAPT Nathan George commenced his academic career through a Bachelor of Psychology with Honours in clinical psychology, focused on the psychological and physiological tension release mechanisms of self

- harm behaviours. Drawn to human development within the international community, CAPT George transitioned to a Master of International Studies, completing a thesis on the use of conventional socio-cultural intelligence collection to expedite post-conflict security and stability operations.

Seeking practical experience in post-conflict environments, CAPT George undertook two years of training and work with development agencies in provincial Cambodia. This generated shaped pursuit of formal training in security, leadership and logistics resulting in military service. Commissioned in 2014 as a General Service Officer for the Royal Australian Army Medical Corps, CAPT George served in the 1st Close Health Battalion, the Army School of Health, the Australian Army Research Centre, and the 3rd Health Support Battalion.

CAPT George was selected for the University of New South Wales Future Health Leaders program as a candidate for the Doctorate of Public Health in 2018, and the Chief of Army Scholarship in 2020 for his ongoing academic work on the strategic health implications of climate change on ADF personnel and operations throughout Australia and the Pacific.

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Supply Chain Innovations That Pave The Way for the Reliable Supply of Medicinal Maggots and the Provision of Maggot Therapy in Military and Disaster Care Settings.

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Abstract

In war, soldiers and many more civilians are injured resulting in wounds either from direct trauma or from surgical interventions. All too often, these wounds are heavily contaminated, contain large amounts of dead or non-viable tissue, and become infected. Rapid and repeated debridement and infection control is critical but difficult to achieve in the austere care setting with limited resources. With likely future conflicts in mind, the US Department of Defense no longer believes it can ensure evacuation within an hour of injury. This means that casualties will need to be cared for extended periods in the field under challenging conditions before they can be evacuated for advanced care. What makes matters worse, antibiotic resistance is common in these care settings further limiting treatment options.

Maggot therapy is the application of disinfected fly larvae to debride wounds, control infection, and promote wound healing. The treatment has a long history dating back to ancient times and tribal medicine. There is also a strong connection to the military setting. The military surgeon Dominique-Jean Larrey observed the benefit of maggots during the Napoleonic war in Egypt. John Zacharias actually encouraged and applied maggots to wounds in the US Civil War. However, modern maggot therapy arose from the battle fields of WW1. The orthopedic surgeon William S. Baer was posted to the Western Front where he observed that badly injured soldiers who had not received care for days were in remarkably good condition when their wounds were colonized by maggots. These observations of the infection control and healing properties of blowfly maggots led to the first medicinal maggot production and clinical treatment program at Johns Hopkins. Maggot therapy was then widely used in the 1930s and early 40s before it fell out of favour when antibiotics became available.

Although maggot therapy is perfectly suited to the austere care environment, as the observations of military surgeons through the ages confirm, it has never been utilized as a wound care modality in modern military medicine. While prejudice, disgust, and overconfidence in conventional medicine can be blamed in part, the major barrier that cannot be addressed with education or sensitization of military physicians and nurses, has been the lack of a supply chain that would ensure reliable forward supply.

Research at MedMagLabs, Griffith University, has established that supply chains can be developed that achieve reliable supply of high-quality medicinal maggots in the most austere of environments. Depending on the care setting and access to resources, medicinal maggots may be produced at the point of care with basic local materials and expertise, or they may be produced in purpose-built mobile laboratories that can supply larger quantities of medicinal maggots to field hospitals. Finally, the shelf life of medicinal maggots could be lengthened from one to two days at the moment to longer than a week. This would allow for longer distribution times to the point of care. It would also permit troupes to take provisions of medicinal maggots along to high-risk deployments that likely result in casualties and prolonged field care.