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The Journal of the Australasian Military Medicine Association

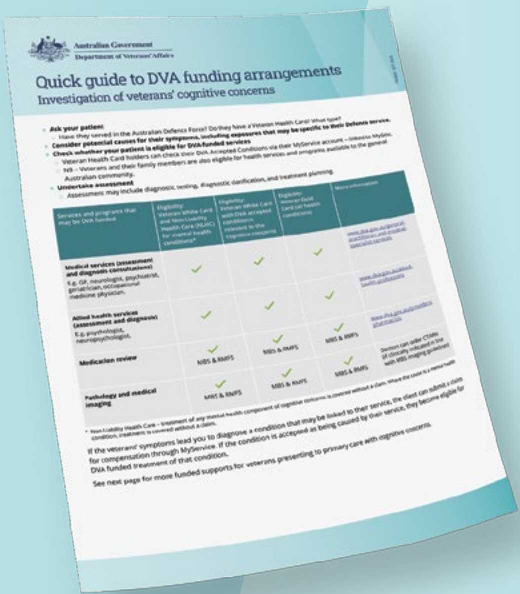
Australian Government
Department of Veterans' Affairs

Investigation of veterans' cognitive concerns

Guide to funding arrangements

The Department of Veterans' Affairs (DVA) has released a quick guide to help general practitioners and others understand what DVA supports are available when presented with a veteran with cognitive concerns.

We encourage providers to use this guide for eligibility information related to cognitive care, and to understand DVA's funding arrangements.


Australian Government
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Quick guide to DVA funding arrangements
Investigation of veterans' cognitive concerns

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STATEMENT OF OBJECTIVES

The Australasian Military Medicine Association is an independent, professional scientific organisation of health professionals 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.

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Editorial

The Nature and Character of War

As we enter 2026, consideration needs to be given to various conflicts and touchpoints around the globe, from Ukraine to South Sudan, Middle East to the South China Sea. While the Australian Defence Force has not been drawn directly into these conflicts, there remains the potential for escalation, for which we all need to continue to prepare both our militaries and broader societies.

The broad nature of warfare has not changed over the millennia, with the core concept of 'organised force for political ends' remaining constant.[1] The 'dominance of non-linear factors', including friction, chance, uncertainty, fluidity, disorder, human nature, violence and danger, gives war both its fundamental and unchanging nature and the potential for unpredictable consequences.[2] The character of war, however, is in constant flux, as military forces innovate and learn, political and social systems transform, and technological advances are incorporated.[3] Military success, however, is not dependent on decisive battles, military leadership or even evolving technologies, which, while playing important roles in the context of conflict, are not the critical factors. Success or failure is instead integrally entwined with an understanding of the fundamental nature and evolving character of war, with all its social, political, economic and technological aspects, and the effective application of that understanding on the battlefield. These elements of war have extended across all eras, and, while the character of war continues to evolve, failure to understand its ramifications, and how to manage them, will directly impact on the success of the conflict and its impact on our nations and communities.

Our first issue of 2026 contains a range of articles on diverse topics spanning the use advanced military practitioners, military medical training, care of soldiers, transition out of the military, infectious disease and 'black measles'. We continue to attract an increasing number and range of articles, including from overseas, as is demonstrated in this issue. Other military and veterans' health articles, however, are always very welcome, and we would encourage all our readers to consider writing on their areas of military or veterans' health interest. We would particularly welcome papers based on presentations given at the Adelaide 2025 AMMA conference but welcome any articles across the broader spectrum of military health.

Dr Andy Robertson, CSC, PSM
Commodore, RAN
Editor-in-Chief

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1 Colin S. Gray, "The Changing Nature of Warfare?," *Naval War College Review* 49, no. 2 (1996): 8.

2 Williamson Murray, *The Dark Path: The Structure of War and the Rise of the West* (Yale University Press, 2024), 8.; United States Marine Corps, *Warfighting - Fleet Marine Force Manual 1* (Department of Navy, 1989), 3-12.

3 Murray, *The Dark Path,* 8.; Gray, "The Changing Nature," 8.

Canadian Armed Forces Members' Perspectives on Health Service Transition Prior to Military Release

A C Williams, C Donnelly, D Pedlar, H Cramm

Abstract

In Canada, military-to-civilian transition (MCT) involves transitioning from military to civilian primary care. This is an important but underexplored aspect of MCT. We investigated releasing military members' perspectives on the transition from military to civilian primary care by analysing previously collected interview data from 69 Canadian military members. We found that participants were apprehensive about accessing primary care after release, felt more support from the military was needed, and made recommendations for improving support. Our findings help explain the high proportions of difficult adjustment to MCT among veterans and highlight the need for more robust support for releasing military members.

Keywords: transition to civilian life, Canadian Armed Forces, veterans, primary care, qualitative methods.

Introduction

Approximately 5000 Canadian Armed Forces (CAF) Regular Force members leave service annually.[1] Military-to-civilian transition (MCT), which begins well before the official release date, marks a major turning point in the life of CAF members and has implications for wellbeing.[2] While most veterans report an easy adjustment to civilian life, the proportion of veterans reporting a difficult transition is growing.[3] An inherent aspect of MCT in Canada is transitioning from the military healthcare system to the civilian healthcare system. CAF members access the federally operated military healthcare system designed to support military operations during service. The military healthcare system has a high degree of integration across health sectors, facilitating access to and coordination of care. After release, veterans must navigate the civilian healthcare system, which serves a much broader population with far less integration between sectors. Learning to navigate a new healthcare system, potentially for the first time as an adult, can be challenging for newly released veterans and could aggravate transitions that are already difficult.[4]

Primary care is an important source of healthcare in both the military and civilian healthcare systems. Primary care is the first point of contact with the healthcare system that provides person- and community-focused care[5] and is associated with better health outcomes.[6] During service, all CAF members have consistent access to primary care providers across bases.[7] After release, however, veterans must arrange their own primary care provider in the civilian system, and there is no guarantee they will find one in a timely fashion,[8] especially considering ever-increasing reports highlighting the primary care crisis in Canada.[9-11] Canadian research has shown that primary care is a key source of healthcare for CAF Veterans in the civilian healthcare system[3,4,12] and that veterans are more likely to use primary care services than their civilian comparators.[3,13]

It is important to note that while Veterans Affairs Canada (VAC) facilitates access to some private health services (e.g., psychologists, occupational therapists) for service-related injuries, they do not offer primary care services. Furthermore, only 19% of veterans are VAC clients.[14] It is unclear how much formal support exists to prepare veterans specifically for the health service transition through VAC or the CAF.

Veterans experience some health conditions such as chronic pain, hearing problems, depression and post-traumatic stress disorder at greater proportions than the general Canadian population.[15] Veterans with a medical release are more likely to report

having a difficult adjustment to civilian life.[16] For decades, primary care has been the gatekeeper for the public healthcare system in Canada,[17] making it vital for those requiring specialist care and effectively addressing the health needs of people with chronic health conditions.[18] Health system transition associated with MCT is an important issue.

While no research has specifically examined access to primary care during MCT, some general studies of MCT suggest that access to and quality of primary care may be problematic. Lee et al. found that setting up new health providers, including primary care providers, in the civilian system was the second most challenging aspect of MCT, just behind identity loss.[19] In a qualitative study by the Veterans Ombudsman, Veterans reported that finding a primary care provider was challenging.[20] The most recent Life After Service Survey results indicated that approximately 20–35% of participants who released within the last two years did not have a primary care provider,[3] far below the national proportion of 14.5% reported by Statistics Canada in 2019.[21] This discrepancy is disconcerting, considering the first two years after release may be the most difficult.[2]

Access to primary care throughout the MCT process is an important consideration but has received limited attention in MCT literature, particularly in Canada. In this study, we sought to answer the research question: How do CAF members facing military release experience the impending transition from the military healthcare system to civilian primary care?

Methods

We used interview data from the first qualitative longitudinal study[22] on MCT on which the first and last authors were team members. While health system transition was not the sole focus of this study, it was encompassed within the overall research purpose of examining the health and wellbeing of CAF members/Veterans throughout MCT. The data aligned well with our research question and gave us a unique opportunity to examine data from a sample not easily reproduced due to challenges associated with recruiting active CAF members[1]. Further details on the purpose and methodology of the longitudinal study can be found in the final report.[23]

We conducted a phenomenological analysis of the health service and access data collected from participants before they were released from the military using data from English-speaking Regular Force Veterans. Reserve Force participants were excluded because they typically access healthcare through the civilian system during service and do not undergo the same health system transition as those in the Regular Force. Phenomenological data analysis was selected because it enabled us to specifically examine CAF members' lived experience of health service transition. In addition, the methods used in the initial stages of data analysis (i.e., open coding), which had already been conducted, are consistent with phenomenological data analysis.[24] During initial coding, health and health services were identified as a category of wellbeing during MCT. These data were subject to deeper analysis to better understand participants' lived experience of primary care transition.

Our analysis began with familiarisation of the data. Given the large sample in the longitudinal study (n=80), summaries of each interview were written to promote data familiarisation and prepare for subsequent interviews. We read these interview summaries for all included participants. Next, the data associated with the health and health services category were extracted and subjected to deeper analysis emphasising health services transition, particularly primary care. In line with phenomenological data analysis,[25] a textural description of the health data was created to describe what the participants experienced, then a structural description was created to describe how participants experienced the transition. These descriptions were then merged to synthesise the textural and structural descriptions—this textual-structural synthesis is the essence of the experience.[25] The qualitative data analysis software program MAXQDA[26] facilitated data analysis.

The longitudinal study was granted ethics clearance from the Health Sciences and Affiliated Teaching Hospitals Research Ethics Board (HSREB; #6027248).

Results

A total of 80 CAF members with an impending release were interviewed between May 2018 and January 2019 with interviews lasting 60–120 minutes in length. After applying our inclusion criteria, a total of 69 interviews were analysed. Most participants were

1 The Canadian Department of National Defence has its own research ethics and dissemination policies that clash with those of public universities. While negotiations are possible, they can be protracted. Given that this work was completed as part of a doctoral dissertation, it was not feasible to undergo lengthy negotiations, so we used data from a project where these negotiations had already taken place.

Army members (n=32) followed by Air Force (n=22) and Navy (n=15), were from non-commissioned ranks (n=47), and had at least one disaster or combat deployment (n=47). Most participants were releasing for medical reasons (n=41) and had more than 15 years of service (n=56). Most participants were male (n=49), ranging in age from 27–61 years (average: 48 years). There was representation across Canada, with most participants (n=40) coming from the central region (ON and QC) followed by Western (n=17) (BC, AB, SK and MB) and Eastern Canada (n=12) (NB, NS, PEI and NL). Three themes that encompass the participants' pre-release experience of transitioning from the military healthcare system to provincial primary care were identified: 1) on the precipice: anticipating change; 2) making the leap: support and preparation; and 3) 'it would be nice if …': recommendations for improvement.

On the precipice: anticipating change

When reflecting on the upcoming transition to civilian healthcare, many participants described feelings of anxiety, and sometimes fear, driven by uncertainty around how to navigate the change.

'That's a big worry for me': anxiety and fear

As participants envisioned the health services transition associated with MCT, most anticipated a significant change from the system they had become accustomed to in the CAF. Some expected the transition to civilian primary care to go smoothly and had already established informal connections with a primary care provider. Often, these participants indicated they had gotten lucky in finding a primary care provider so early in the process, which removed the uncertainty around primary care access:

> *'I was very lucky that I found, um, somebody that was taking – one of those kiosk-type signs that said, 'Taking patients.' … I've heard the horror stories. Um, mine wasn't a horror story. I can call it lucky. Just happened to be where I am currently and there was a doctor.' (participant #48)*

For many others, the impending transition to civilian healthcare elicited concern, worry, anxiety, or even fear: 'I guess, my biggest worry is just getting proper healthcare' (#49).

Uncertainty

The degree of uncertainty surrounding the health service transition fuelled participants' anxiety about the transition, adding another layer of stress to the transition experience. First was the lack of clarity around the health services transition. Many participants had little idea of what to expect in the shift to civilian primary care and were unclear about the process. One such participant expressed confusion around how to find new providers in the civilian primary care system, which they had never done before: 'I cannot emphasise strong enough, I guess, the… ambiguity I'm facing with health care … the lack of, ah, a firm, firm direction and outcome of where things are is definitely not helpful' (#49).

Apprehension about a possible change in health service access and quality also contributed to participants' uncertainty. Many participants said they had excellent access to primary care in the military and were expecting a decrease in ease of access after release. Many participants reported not needing to think about healthcare in the military because it was taken care of for them. Many felt out of touch with the civilian system, especially those who have spent their entire adult lives in the military. They understood things would change but did not know how long they might expect to wait for a primary care provider, and this uncertainty led to concerns about gaps in access to care after release. A participant summarised this:

> *'Being a military member, you're kind of in a fantasy land. … Like, even dealing with my kids and my wife, I think I'm a little bit out of touch with how health care works. … It's kind of funny because the military is almost like a parent in some ways, right? So, they never really get exposed to what most of the country goes through, I'd say, for health care.' (#82)*

Apprehension about entering a new health system was also driven by concern about the potential difficulty in finding a primary care provider. Many cited nationwide shortages in primary care providers and the experiences of other veterans as the primary driver of this concern:

> *'I'm a little bit stressed about finding a family doctor. Everybody else I'm pretty set up with now, I think. But a family doctor is what I need more than anything. Everything I've been told, it's going to be very difficult to find one …' (#51)*

Many participants speculated about how they might access health services without a family doctor and envisioned a tedious experience with long waits in emergency departments or walk-in clinics. This was a distressing prospect for some, given the ease of access they currently have in the military healthcare system.

Many participants remarked on the abrupt loss of access to the military healthcare system, with some expressing a sense of abandonment. All participants were imminently facing the loss of their primary care provider and many were also losing mental health and other interprofessional primary care providers with whom they had built strong therapeutic relationships. Finding a new set of primary care and other healthcare providers in the civilian system meant having to re-tell one's story to new people and establish new relationships, which was troubling for some:

> *'The day you're finished with military, you have no more access to any service that you had access to before. From that day forward, you have different services. You have, you know, like even your healthcare plan is different. Your dental plan is different. You, all these things you have to get used to that you're not used to. It all stops … So, I think that's a huge, huge mistake on the part of the military to withdraw all services, basically, the day you leave the military. You're just, you are, you're left flapping in the wind.' #12)*

Some participants also expressed concern about civilian primary care providers not understanding their unique health needs, further contributing to apprehension: 'that's a fear: that I'm totally afraid that some civilian doctor isn't going to understand the military side' (#41). The loss of primary care and other health services, as well as the threat of a possible gap in access, created acute uncertainty and distress for those with ongoing health issues.

> *Many participants felt that maintaining or improving their health was the key to realising a positive transition, so continuity of health services was paramount. When asked what their most important needs would be moving forward, a participant stated: 'certainly health needs. I need to make sure I stay connected, um, with my healthcare providers, because things are constantly evolving' (#25).*

The potential disruption in continuity was disconcerting, especially for those with ongoing mental health issues who identified access to health services, including primary care, as a key future need. Participants with chronic and/or multiple health issues that require ongoing access to care expressed great concern, and sometimes fear, about the shift to the civilian healthcare system. One such participant was particularly frank:

> *'Um, well, that's the other part of a fear on, on the other side. There's no available doctors here in, you know, [city]. So, for me, where I have a stomach issue, a back issue, a mental health issue that requires, ah, you know, ah, prescriptions … I'm worried that I'm not going to have the, ah, family doctor because, for 30 years, I've never had to have one. And here, locally, there's none available. So, you're put on a list. So, after my three months of running out with my meds, I've got to go sit at an Emergency Room, trying to get a replace—a, ah, replacement prescription for something that I'm about to expire. … it scares the shit out of me.' (#69)*

Participants pointed out that there is much at stake for those with health issues if they cannot find a primary care provider because they saw primary care as a vital service in managing their health issues. This was particularly salient for those with mental health issues. Participants who were receiving VAC injury/illness awards or long-term disability felt particularly stressed about finding a primary care provider to complete mandatory medical forms.

Making the leap: support and preparation

Participants pointed out that the CAF has some procedures to ensure releasing members' health is stable. Many participants described undergoing a medical evaluation to provide an up-to-date summary of their health status:

> *'The military is really good at making sure that you do what's called a Release Medical. … to see whether or not there are any, um, issues that you're not aware of that is actually is an issue' (#31).*

Managing MCT is a complicated and taxing endeavour, and many participants describe the substantial administrative burden they encountered during this transition. Participants describe some support from the CAF, but overall, there was a sense that they had sole responsibility for navigating the health service transition, especially for primary care:

> *'There's a social safety network around us and, all of a sudden, it feels like it's all gone. Your – the doctor that I've had for 25 years, she's gone … So, and to think that we're going out there. And, all of a sudden, it's like, 'Okay, you're on your own to find everything.' (#43)*

A few participants indicated the Second Career Assistance Network seminars[2]—known as SCAN seminars—advised them of the need to set up health services in the civilian system but reported little formal support to connect members with civilian primary care providers:

> *'The Forces tells you that you need to go and do it, but they don't help you' (#06).*

Several facilitators helped veterans prepare for the transition to civilian primary care. Some participants reported reaching out to the Military Family Resource Centre for support in finding primary care providers—specifically, the Veteran Transition Program and Operation Family Doc—with some success. Others credit case managers in the military healthcare system or the Transition Centres for providing tips and resources. Some participants' military primary care providers referred them to civilian colleagues practising in the civilian system.

Proactive preparation was seen as an important aspect of navigating MCT, but for many, this was stymied by several barriers. Participants without informal connections to a civilian primary care provider pointed out they could not obtain provincial/territorial health insurance until after their release date, and many of the primary care providers they contacted would not accept them without it:

> *'I need a doctor. Um, I can't get a health card [inaudible] three months before I release. Ah, so I can't get a, officially get a family doctor until after I have a health card number, so.' (#51)*

This was frustrating for many participants, especially those with a long lead up to release who could not take advantage of programs designed to help them find a primary care provider until after their release was official. Other barriers included a lack of primary care provider supply in the local region, difficulty making time to search for providers while still working full-time, and being overwhelmed with the magnitude of administrative tasks associated with MCT.

'It would be nice if …': recommendations for improvement

When reflecting on the expected challenges of the transition to civilian life, participants identified several ways to improve the health service transition. The most prominent was to extend access to the military healthcare system after the release date to eliminate the abrupt shift between healthcare systems, enabling veterans to maintain continuity of primary care and other services while they get set up in the civilian system:

> *'The medical follow-up piece, um, would be useful. Um, if I was able to continue to, if I was, for example, being treated for my mental health, to be able to continue to access those services, at least on an interim basis for a while after releasing, would be fabulous.' (#07)*

Other participants advocated for developing a formal program to help releasing military members attach to a provincial primary care provider and to better prepare veterans for what they can expect in the civilian healthcare system. One participant pointed out that the military prepares you for military service through basic training, and there should be a similar preparation for the civilian world:

> *'You're stripped down. You're rebuilt. You're re-programmed. And then, you're left to your own devices when it's time to go out the door. … we kind of need a, you know, a few-week training to get out.' (#70)*

Some participants pointed to veterans' special health needs and indicated that providing service through veteran-specific clinics or hospitals would be ideal:

> *'The challenge with, with each person that comes out of the military, they walk into a normal civilian hospital and they're – I'm not saying that they're special in any way, shape or form as a human being than anybody else. But they definitely have different criteria than the average human being … If you had a veteran hospital that knew the individual, has that file there and everything and there was no guesswork, or anything, and, and that person has been going there for a while, because it is set up just for veterans.' (#68)*

The need to address veteran-specific health needs was consistently underscored across the data.

Discussion

This is the first Canadian study to examine the pre-release experiences of CAF members as they prepare for the transition from military to civilian primary care, providing important insights into MCT. For many participants, maintaining or improving their health was a key priority and continuous access to healthcare, particularly primary care, through the transition was critically important. The abrupt loss

2 Second Career Assistance Network (SCAN) Seminars are two-day seminars which are meant to prepare CAF members for their eventual release from the CAF.[27]

of guaranteed access to primary care through the military healthcare system, coupled with the need to make new connections with civilian clinicians independently, created the potential for a gap in access to primary care, causing anxiety among many participants. For those concerned about their current or future health, the transition to civilian health services loomed large in their minds.

Our findings are consistent with other Canadian studies that suggest finding a primary care provider after release may be difficult.[3,19,20] The Life After Service Surveys show that recently released veterans were more likely to report a difficult adjustment to civilian life than those with earlier releases,[3] indicating greater difficulty with MCT for those in the peri-release period. Authors found that medical release was more strongly associated with difficult MCT than other factors (e.g., service element, rank).[16] Our results provide some explanation for the difficulties faced by these subsections of the veteran population, supporting past suggestions that health service transition may exacerbate difficult adjustment.[4]

Improving veterans' ability to proactively prepare for the health service transition is paramount. As noted earlier, data from Statistics Canada[21] and VAC[3] indicate that the proportion of newly released veterans without a primary care provider is higher than that of the national population. Unfortunately, access to primary care in the civilian system has become even more dire in the four years since Statistics Canada published their analysis. The Angus Ried Institute recently reported that one in five Canadians do not have a family doctor,[28] and The Canadian Broadcasting Corporation recently reported that there were two million people without a family doctor in Ontario (29), where the majority of veterans reside (30).

A recent Canadian study found that the average wait time to find a primary care provider was one year, with some waiting over three years.[8] Many participants with ongoing health issues requiring regular care expressed apprehension about accessing health services without a primary care provider and were concerned about the possibility of having to wait long periods at walk-in clinics or emergency departments. According to research conducted on unattached Canadians with chronic illnesses, these concerns have merit. Such research has found that walk-in clinics and emergency departments were the main sources of care for unattached civilian patients[31,32] and recently released CAF Veterans.[33] The study participants found accessing care through walk-in and emergency clinics to be onerous, creating a barrier to care seeking. Indeed, primary care literature in Canada and internationally indicates that walk-in clinics and emergency departments are not ideal for accessing primary care because they lack continuity and coordination of health services—a long-term relationship with a personal primary care provider leads to better health outcomes.[31,32,34]

Some participants also expressed concerns about civilian providers' ability to understand and address their unique needs as military veterans. This aligns with findings from a recent consultation with veterans conducted by The Chronic Pain Centre of Excellence for Canadian Veterans.[35] Indeed, American research has identified the importance of civilian providers' military cultural competence[3] in providing effective care[36-39] with more recent work done in Canada.[40] Recent Canadian research on veterans' health service utilisation in Ontario noted concerns about civilian primary care providers' capacity to manage veteran health needs,[12] highlighting the importance of improving military cultural competence.

Implications

Our results reveal a gap in formal support for the primary care system transition that must be addressed. The Canadian Forces Morale and Welfare Services administers the Veteran Family program[41] and provides information about healthcare access on their website.[42] However, much of their offerings, including the Veteran Family Transition Program, are for medically releasing veterans, which accounts for only 31.2% of releasing members.[3] More assistance available to a broader spectrum of releasing members is necessary because, as noted earlier, approximately 38.7% of veterans report a difficult transition, regardless of release type.

While Canadian resources to support both veteran and civilian primary care providers working with veterans are limited, The College of Family Physicians of Canada, in partnership with VAC, recently released a guidance document for primary care providers working with veterans[43] Calian Health has also published a guidance document for civilian healthcare providers as well as newly released veterans based on research.[44] In addition, some local CAF Transition Groups are developing programs to educate releasing CAF members on navigating the civilian health system.[45,46]

3 Military and Veteran cultural competence is a healthcare provider's capacity to be aware of and sensitive to Veteran culture and to provide care with these needs in mind.[39]

There are supports in provincial healthcare systems aimed at facilitating access to health services for veterans, such as centralised wait lists for primary care providers.[47] However, many of our participants were delayed in their search for a civilian primary care provider because they would not have access to provincial health insurance until their release date. Allowing veterans to access provincial health insurance before the official release date may help bridge this gap in continuity.

It is encouraging to see some improvements in health service access for Veterans. However, more research is needed to better understand the health service transition and meaningfully inform programs and policies to support veterans during MCT. Our results are on the cutting edge of this movement and can inform future efforts to support veterans through the transition to civilian healthcare.

Limitations

Our sample contained more women and medical releases than the general CAF population. Women represent 15.5% of CAF Regular Force members,[48] while they comprise 27.5% of our sample. A specific examination of women's MCT experiences within the longitudinal study has been done and reported elsewhere.[49] Medical releases accounted for 56.5% of our sample compared to 32% of the 2019 Life After Service Survey sample.[3] While medically releasing veterans do seem to have greater difficulty with the transition, those who release voluntarily also struggle and may have challenges that are different from those of medically releasing veterans. Therefore, future studies should focus on the perspectives of CAF members/Veterans who release voluntarily.

The data used in this study were collected as part of a large longitudinal study focusing on mental health and wellbeing during MCT. While health service transition was encompassed within the overall purpose of the longitudinal, the broad focus on wellbeing may have limited the depth and nuance of the data.

Conclusion

An inherent part of MCT is the shift from military to civilian primary care—an important aspect of MCT, considering veterans have unique health needs that must be addressed in civilian primary care. This is the first study to specifically examine healthcare system transition, focusing on primary care, during MCT from a pre-release perspective. Our results align with recent research suggesting veterans may have difficulty finding a primary care provider and provide some explanation for the high proportions of difficult adjustment seen in medically and recently released veterans. Our results highlight the need for more robust supports related to the health service transition and improving military cultural knowledge among civilian primary care providers. While interest in the health service transition among releasing CAF members/Veterans is increasing, more research is needed on the healthcare system transition to increase the capacity of federal and provincial governments and primary care providers to support CAF members and Veterans through the transition to civilian life.

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Assessing the Role and Employability of Military Advanced Practitioners in Deployed Pre-Hospital Setting: A Qualitative Interview Study

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Key messages

1. APs support healthcare delivery and workforce flexibility in deployed PHEC environments.
2. Military APs are autonomous and have the potential to operate independently in the Defence Medical Service and remote pre-hospital care.
3. Multi-professional trust is key to AP autonomy in military pre-hospital care, but standardised roles and careers are needed to overcome hierarchical barriers and ensure career progression.

Abstract

Introduction: Previous research in the UK civilian sector indicates that advanced practitioner (AP) roles could significantly enhance the Defence workforce by addressing increasing healthcare demands in austere and remote environments. Defence Medical Services (DMS) could deploy APs to deliver pre-hospital emergency care (PHEC) on operations, potentially improving patient outcomes in resource-limited settings. While the DMS has trained a few APs, limited research defines their operational role. This study assesses whether military APs can contribute to the deployed pre-hospital workforce.

Methods: Qualitative, semi-structured interviews were conducted with 10 military APs and 12 non-AP healthcare professionals (paramedics, nurses and doctors) purposively sampled from the DMS PHEC subspecialty board. The study explored the roles, experiences and challenges of military APs and examined non-APs' perceptions of their employability and integration within DMS. Data were thematically analysed, focusing on role clarity, collaboration and the operational impact of APs.

Results: There were three main themes: 'Understanding the gaps, training and career challenges for military APs'; 'Building trust and managing boundaries in multi-professional teams'; and 'Exploring future roles and employment of military APs'. Participants recognised the potential of military APs to operate autonomously in remote locations. Trust fostered through mentorship and collaborative relationships emerged as essential for APs' autonomy and professional growth. However, hierarchical structures within military and medical systems presented challenges, highlighting the need for clearer career management and role identification for APs. Participants advocated for standardising AP roles, aligned with civilian practices, to ensure consistency in roles and expectations. Participants suggested that military APs could enhance care delivery in prolonged field care and critical care retrieval, particularly in PHEC Level 8 teams. APs perceived their role offered enhanced flexibility to the PHEC workforce.

Conclusion: To maximise AP potential, the DMS must continue fully developing an AP strategy with workforce implementation. APs offer opportunities to bridge gaps in operational care, improve patient outcomes and support clinical career progression for nurses and paramedics.

Introduction

Advanced practice represents an evolving level of clinical expertise for nurses and allied healthcare professionals (AHPs), such as paramedics, pharmacists and physiotherapists. Advanced practitioners (APs) are trained to work autonomously, extending their skills and knowledge beyond traditional scopes of practice, typically supported by Master's level education.[1]

To provide context for this study, APs refer to registered pre-hospital nurses or paramedics who have undertaken, or are undertaking, an MSc in Advanced Clinical Practice to upskill their role beyond nurse or paramedic. This qualification is aligned with the UK Health Education England (HEE) framework, which defines advanced practice under four distinct pillars (clinical practice, education, leadership and research). APs are typically trained to work beyond the scope of traditional registered healthcare professionals, often under a governance framework.

Civilian frameworks, such as the College of Paramedics' hierarchy, 'Specialist, Advanced and Consultant Paramedics', reflect increasing levels of expertise and autonomy as they progress through career stages.[2] Advancements in paramedic practice in non-military settings were first introduced in the '90s to respond to rising emergency calls, specifically for urgent care. Outside of urgent care, further specialisation of paramedics and a minority of nurses has since occurred in specialist pre-hospital critical care, often working for a helicopter emergency response service (HEM). UK paramedics represent most of the workforce due to their established career pathways in civilian pre-hospital emergency care (PHEC). In contrast, nurses comprise a smaller proportion, often entering through specialist retrieval or dual-trained roles. APs in civilian PHEC were developed in response to recommendations in UK national policy reports concerning trauma care.[3,4] Since expanding their scope of practice in civilian systems, APs now deliver advanced skills such as advanced analgesia, sedation, ultrasound and other critical care interventions, contributing to decreased patient mortality.[5]

Countries like the United States, Australia and New Zealand have further advanced AP roles, enabling paramedics and nurses to deliver pre-hospital critical care autonomously, including Rapid Sequence Induction (RSI), a practice reserved for physicians in the UK. Australian Mobile Intensive Care Ambulance (MICA) paramedics exemplify this evolution. The establishment of advanced paramedics in the United States has been reported to have led to a 20% lower mortality rate for patients than the UK traditional paramedic model.[6]

In the UK military context, PHEC is delivered by either nurses or paramedics. Those with relevant experience and clinical exposure may later upskill as an AP for their clinical development, building on their foundational scope to undertake extended clinical responsibilities. The difference between an AP and a paramedic or pre-hospital nurse is that nurses/paramedics typically work under clinical protocols and guidelines. In contrast, APs can operate with full clinical autonomy, using advanced decision-making to assess, diagnose and manage patients independently within a governed scope of practice.

As such, the UK Army, Navy and Royal Air Force (RAF) have begun to train a small number of nurses and paramedics in advanced practice for clinical development since 2010; however, there remains a lack of clarity on a defined operational role in pre-hospital care.[7] Currently, there is a lack of research on the role of APs in military contexts, creating a knowledge gap in this area.[8]

This study presents part of a larger program of research that aims to investigate the potential contribution of APs within the Defence Medical Services (DMS) to understand if they could deliver similar benefits to those observed in the National Health Service (NHS) and international PHEC settings. Specifically, this qualitative study addresses two research questions:

1. What work activities do military APs currently perform in pre-hospital practice?
2. What are the perceptions and experiences of military pre-hospital personnel regarding the current AP role, and what are their views on its future value in military settings?

Methods

The exploratory qualitative study used semi-structured interviews with two groups of participants: UK military APs and non-APs. Interviews with APs were used to understand and explore the experiences of current military pre-hospital APs who have been previously deployed as level 5 practitioners (nurses or paramedics), see Figure 1, PHEC levels of capability.[9]

The UK military PHEC levels of care deploy different teams of varying levels and are scaled up and down depending on the pre-hospital capability required. The Medical Emergency Response Teams (MERT) may be called upon to provide pre-hospital care and rapid evacuation. A MERT is a UK Defence medical evacuation asset that uses either a helicopter,

battlefield ambulance or hovercraft to bridge the gap in time between injury and treatment. Each MERT consists of a specialist pre-hospital team with different levels of clinical expertise. This includes either a consultant in Emergency Medicine or Anaesthetics (PHEC level 8), a Specialist Emergency Medicine Nurse (PHEC level 5) and two Paramedics (PHEC level 5).

Interviews and participant demographics

Interviews with APs focused on their training, preparation and ongoing requirements for the role during peacetime civilian duties and operational postings. Discussions also covered working culture, relationships and hierarchies. Interviews with non-AP participants, including those with military PHEC experience, explored their understanding of the AP role, expectations and perceptions of its potential benefits in military PHEC.

Participant selection

Participants were purposively selected based on military experience. APs from all three services (Army, Navy and RAF) were included, with eligibility limited to those MERT-qualified, deployed on PHEC operations and practising at an advanced clinical level. Other professions, such as physiotherapists and pharmacists who work as APs, were not included in this study, as their roles are not associated with PHEC in the deployed operational context.

Non-AP participants were sampled from the Defence Sub-Specialist Pre-Hospital Board, which advises on military pre-hospital care. This group included Defence Consultant Advisors, Defence Specialist Advisors and MERT subject matter experts.

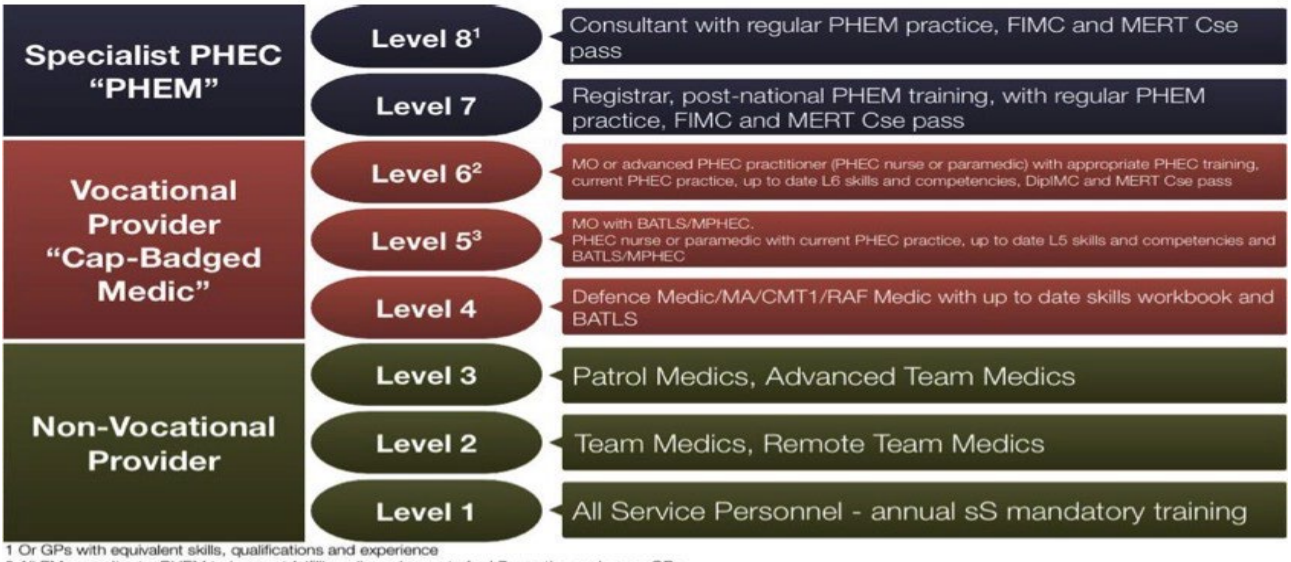
The study included 10 APs ('AP1' to 'AP10') and 12 non-APs (coded as 'DR' for doctors, 'P' for paramedics and 'N' for nurses). Demographics are presented in Tables 1 and 2.

Trends and context

Most AP participants were nurses, reflecting the military's prioritisation of nurses for advanced practice training in roles like Military Nurse Practitioner (MNP). These nurses typically had Emergency Department (ED) and PHEC experience. Conversely, paramedics serving as APs were primarily reservists, combining civilian practice with part-time military service, unlike full-time, regular personnel.

This distinction contrasts with civilian PHEC practice, where paramedics, rather than nurses, are predominantly trained for advanced roles. Consequently, the findings may have limited generalisability to civilian contexts, where training pathways and professional experiences differ significantly. In addition, APs were either currently undertaking or had completed an MSc in Advanced Clinical Practice. APs begin applying advanced clinical skills during training but only gain full autonomy upon completion, supported by clinical governance and supervision. While trained under the same framework, APs' clinical backgrounds (nurse or paramedic) influence their skill sets and areas of focus. As such, not all APs are trained in identical procedures (e.g., sedation), and practice varies depending on service needs and clinical exposure.

Figure 1: Defence PHEC Levels of Capability.[9]



1 Or GPs with equivalent skills, qualifications and experience
2 All EM consultants, PHEM trainee not fulfilling all requirements for L7 practice and some GPs.
3 Will often require MERT course for role

Data collection

The interviews used a structured topic guide to address participants' understanding of AP roles in civilian and military settings and the potential benefits of these roles for patient care.

Interviews with AP participants focused on their current work, training and development needs and, where applicable, their operational deployment experiences and the application of advanced skills. The discussions concluded with questions about the participants' vision for a future deployed AP role.

For non-AP participants, questions aimed to explore their views on the AP role, including any prior experience working with APs in military or civilian settings. Initial questions were broad to gauge existing knowledge before transitioning to military-specific topics such as, 'Do you think APs should be deployed on military operations?'.

Interviews were conducted between September 2020 and April 2021, either face-to-face or via virtual video conferencing, depending on participant preference. Virtual interviews were the preferred method due to COVID-19 constraints. Notes were taken during the initial portion of each interview to document participant characteristics, such as current role, deployment history and additional skills training. All interviews were digitally recorded and transcribed verbatim for analysis.

Table 1: Demographic characteristics of AP participants

Id.	Nurse/ paramedic	Qualification	Reg or reserve	Firm-base role	Deployment history	Additional skills training
AP 1	Nurse	MSc Advanced Clinical Practice	Reg	Ops role	MERT Herrick (Afghanistan), Telic (Iraq), BATUK[1] (Kenya).	Nil
AP 2	Paramedic	DipIMC[2], PG Dip Advanced Practice	Reserve	Critical Care Practitioner (CCP) Air Ambulance	BATUK and MERT HERRICK	Sedation Course - independently sedate. Surgical Skills Course - independently perform thoracostomies and surgical airway. Royal College Emergency Medicine (RCEM) EM Level 1 Ultrasound Training ALS[3] and APLS[4] Course.
AP 3	Nurse	PG Dip Advanced Practice	Reg	ACP Emergency Medicine (EM)/ PHEC	MERT HERRICK and BATUK	PHEC University Course
AP 4	Nurse	MSc Advanced Clinical Practice	Reserve	ACP EM/PHEC	MERT BATUK	Nil
AP 5	Paramedic	MSc Advanced Clinical Practice	Reserve	CCP Air Ambulance	MERT HERRICK	CCP lone working
AP 6	Nurse	PG Dip Advanced Practice	Reg	ACP EM/PHEC	MERT BATUK and HERRICK	Advanced Clinical Practitioner (ACP) RCEM pathway
AP 7	Nurse	MSc Advanced Clinical Practice	Reserve	ACP EM	MERT BATUK	ACP RCEM pathway
AP 8	Nurse	MSc Advanced Clinical Practice	Reg	Staff Role (non-clinical)	MERT BATUK	Nil
AP 9	Nurse	PG Dip Advanced Practice	Reg	ACP EM	MERT BATUK	ACP RCEM pathway
AP 10	Paramedic	PG Dip Advanced Practice	Reserve	CCP	MERT BATUK	CCP lone working

1 British Army Training Unit Kenya
2 Diploma Immediate Medical Care Exam
3 Advanced Life Support
4 Advanced Paediatric Life Support

Table 2: Demographic characteristics of non-AP participants

Number	Role	Regular or reserve	PHEC level
DR 1	EM Consultant	Reg	L8
DR 2	EM Consultant	Reg	L8
DR 3	EM Consultant	Reg	L8
DR6	EM Consultant	Reg	L7
DR9	EM Consultant	Reg	L8
DR12	EM Registrar	Reg	L7
DR14	GP	Reg	L7
DR15	GP	Reg	L8
P2	Paramedic	Reg	L5
P4	Paramedic	Reg	L5
N1	Nurse	Reg	L5
N3	Nurse	Reg	L5

Data analysis

Thematic analysis was selected for its ability to uncover deeper meanings beyond content analysis, focusing on patterns and sequences within text. This study followed Braun and Clarke's six-step framework,[11] combining both inductive and deductive coding approaches to analyse extensive data (see Table 3). The process began with familiarisation, where transcribed data were thoroughly reviewed. Initial codes were then systematically generated, capturing relevant data segments. These codes were grouped into potential themes, which were reviewed, refined, defined and named to ensure they reflected the dataset accurately. The six-step framework, designed to be flexible and creative rather than rigid, was adapted to fit the research questions. Quirkos qualitative analysis software (Version 2.4, Quirkos Software, Edinburgh, UK) supported the organisation and coding of the transcribed data, enabling clear visualisation of emerging themes.

Ethical considerations

The study was submitted to the RAF Science Advisory Committee board for ethical consideration and then sent to the Ministry of Defence Research Ethics and Committee (MODREC). The study received ethical approval from MODREC ref 887/MODREC/18 11 July 2019 and was also approved by the University of Southampton ERGO 46636.

It was made clear that participation in the study was voluntary, participants were free to withdraw at any time, and that non-participation would not adversely affect their careers. With military participants, the rank gradient between the researcher and participants can have an indirect risk of coercion; additional reassurance within the participant information form was outlined.[13]

Findings

The main themes identified in the analysis were Theme 1: *Understanding the gaps: training and career challenges for military APs*, which highlights training, career progression and role development; Theme 2: *Building trust and managing boundaries in multi-professional teams*, focusing on the importance

Table 3: Thematic analysis

6 Step analysis	Description	Action
Step 1 Immersing within the data	The data was analysed to understand initial findings, impressions and developments, this is known as the researcher becoming familiar with the data.[10]	Transcripts were read, and memos were kept of initial thoughts and patterns.
Step 2 Initial coding	Braun and Clark consider a 'code' as a 'pithy label that captures what's interesting about the data'.[11].	Sentences coded using Quirkos Software
Step 3 Deeper understanding	The data was further explored for deeper analysis, specifically searching for themes, patterns and generalisations.	Codes located in Quirkos were reviewed to look for a shared meaning. These codes generated a thematic map.
Step 4 Re-read establish themes	Data was re-read to clarify potential themes to ensure they were bounded, relevant, and reached saturation.[12]	Using Quirkos software, a thematic map was finalised.
Step 5 Finalisation of themes	Final themes are determined.	Quirkos finalisation of themes
Step 6 Final analysis	Results were formally reported and concluded.	Informed discussion and recommendations

of trust, role clarity, and navigating professional and hierarchical boundaries; and Theme 3: *Exploring future roles and employment of military APs*, which examines potential roles for AP in operational contexts (Table 4).

Table 4: Themes and sub-themes of the interviews

Theme	Sub-theme
Theme 1: Understanding the gaps: Training and career challenges for military APs	Current role and career pathways Training adequacy and clinical currency Clinical value and ongoing role support
Theme 2: Building trust and managing boundaries in multi-professional teams	Trust and role clarity Professional and military hierarchies
Theme 3: exploring future roles and employment of military APs	Deployment value Operational challenges

Theme 1: Understanding the gaps: training and career challenges for military APs

This theme explores the current work of military APs, focusing on role perceptions, career development, management and training. All APs had completed or were undertaking an MSc Advanced Clinical Practice over a minimum 3-year period, combining academic study with clinical postings. However, APs reported that military taskings such as deployments, exercises or mandatory duties often interrupt training with limited protection for study time. Regular military APs reported a lack of a standardised training pathway, requiring them to negotiate training time with their chain of command. Informal arrangements with their NHS civilian hospital placements often dictated how training was balanced with military duties, creating variability and inconsistency in the training experience.

AP6 *'So just recently, having done some pre-deployment training. And having been away for probably a couple of months from the department (NHS Emergency Department), it does affect my (clinical) confidence, but I don't think I'm unusual in that.'*

Having a military consultant instead of a civilian as a clinical mentor working in the civilian NHS hospital placement was perceived as advantageous in better understanding the AP's military role and being more willing to allow the AP to practice their skills.

AP6 *'I think that military consultants working in the same environment (NHS hospital) as you is a huge bonus. They obviously have to fulfil so many SPA's (supported professional activities) if you are working, I think they're probably much more willing to allow you to do stuff than maybe some of the civilian consultants because they sort of understand who you are, and what's expected of you. So, yeah, working with military consultants does make a huge difference.'*

Having worked with civilian APs in the NHS, non-AP participants saw clear benefits in patient care and workforce efficiency in military settings. Their positive experiences led them to believe military APs could bring similar improvements during deployments. They also felt that military APs could offer different perspectives and enhance care during deployments.

DR2 *'Huge numbers of years of experience, expertise and decision making that only comes with those years of experience.'*

However, there were also concerns that the current level of clinical exposure for military paramedics compared to civilians would not be suitable to prepare for the AP role. Most military paramedics in regular service outside of operations do not currently work full-time within an ambulance service. Their role is split between undertaking non-clinical military roles combined with clinical placements with an annual mandated clinical time of 36 shifts. DR2 called for a change in policy regarding current paramedic training with an increased emphasis on clinical time before they could undertake military AP training. It could be surmised from the DR2 reference that a 'proper' training pathway for paramedics, which mirrors the NHS, was required to protect paramedics' training and career pathway, ensuring they remain working in full-time clinical practice.

DR2 *'I certainly won't be pushing to train critical care paramedics for a number of years until the proper paramedic training pathway is really cemented and embedded.'*

Reservist APs' clinical exposure and experience before undertaking the role were considered superior compared to regular paramedics. Reservist nurses and paramedics routinely work in full-time clinical practice, undertaking their military service part-time unless deployed. Therefore, it was felt by some reservists that their clinical experience is greater when compared to regular serving nurses or paramedics in developing autonomous practice.

AP5 *I've been, prior to doing the AP role, in the ambulance service for 15 years, done a bit of HEMS (Rotary Based Medevac) work, urgent care practitioner,*

so you know that kind of sole lone working higher acuity job, as it were. The military will never get their paramedics to that level of experience, of just seeing patients and volume of patients, unless they have a huge change in the way they operate.'

The interviews suggested that the absence of a career pathway has resulted in the misemployment of military APs. Some APs (regular serving nurses and paramedics) had been posted into non-clinical roles such as instructing or staff roles, writing policies or commanding units after training. Participants highlighted the need for clinical-facing posts throughout an APs career. Postings to non-clinical areas stagnated development and onward progression as a qualified AP.

AP3 *'Career pathways that allow you to remain developed and clinical in a deployed space without the requirement to drive a desk somewhere to tick that staff box.'*

In terms of APs deploying, there were some examples of when an AP had deployed in a level 5 PHEC capacity as a nurse or paramedic but not formally as an AP.[9] During the deployments, the AP's skillsets were called upon to assess and treat patients. APs reported that being trained to a higher level and then deployed as a nurse or paramedic blurred the lines of practice. In addition, APs articulated that practising beyond their deployed role (nurse or paramedic) as an AP without the appropriate clinical governance exposed them to possible litigation.

AP1 *'So from a deployment perspective, I've been deployed out to BATUK (British Army Training Unit Kenya) as part of the forward aeromedical capability and not formally deployed as an advanced practitioner, but I have used my advanced practitioner skills in that role to see treat, diagnose and make clinical decisions about patients.'*

However, during the interviews, the lack of policy regarding career pathways was highlighted as an ongoing challenge. From the non-AP group, DR4 felt they could not help provide career advice for military nurses or paramedics aspiring to become APs. It was highlighted that they could see the 'end product' (a qualified AP), although the process to guide them to become an AP and practice as an AP was unclear. DR4 felt this was because they were unaware of a formal AP military pathway.

DR4 *'I think we are all quite naive that we get to the end and see the end product. We don't necessarily support people through that process. And then also how do we signpost people to become APs? Because we often see people who have got maybe the attributes or the skill set to be future great APs but actually, how do you to get them there, often you see doctors giving really, really bad advice, because they just don't understand the pathway.'*

The analysis from the AP interviews revealed that this lack of overarching policy surrounding the military AP role has impacted the AP's career management.

AP1 *'Things that restrict us currently are the lack of policy that supports APs, its embryonic.'*

AP6 *'There's a lack of understanding of it (APs) and the policies are not there, the policy to articulate the requirement and what we're able to deliver just isn't there at the moment.'*

The lack of a clearly defined scope for advanced practice emerged as a key concern among both APs and non-APs. APs reported feeling that their role, achievements and enhanced skill sets were not adequately recognised or understood by their line managers.

At the time, the absence of a sustainable development pathway had already impacted APs, resulting in some considering leaving military service. AP9 has stated that they have looked at leaving the armed forces if they are not retained in a clinical posting to maintain their AP skillset and deploy as an AP after completing their MSc in advanced practice.

AP9 *'I want to remain clinical and progress [as a] practitioner, you know, hopefully, that is in the military and it will see a role for us and we will be utilised.'*

Theme 2: Building trust and managing boundaries in multi-professional teams

Trust and personal relationships between APs, doctors and other medical team members emerged as a key theme, focusing on perceptions of trustworthiness, role definition, and the influence of hierarchies and professional 'tribes' within the military context. Trustworthiness was linked to the awareness and confidence team members had in the AP's abilities, and the AP's need for a supportive environment to practice at an advanced level and manage the additional risks associated with their role. However, the lack of a clear definition and understanding of the AP role often hindered the establishment of trust, creating challenges in working relationships.

AP1 *'So that, I think, it generates quite a lot of ambiguity within how people see you, because there's no standardisation.*'

The demarcation of doctors, nurses and paramedics is well understood with their roles defined by terms

of reference, which outline their scope of practice. These roles are further emphasised with military rank, setting boundaries regarding seniority and experience. The AP role and its position within the medical and military hierarchies is not yet defined and, as such, blurs boundaries of hierarchies, risking conflicts and challenges.

A running theme throughout each interview was the complexity noted within different hierarchies. Within the military hierarchy, rank was identified as an area of concern. It was found that the APs' military rank did not map over to the clinical seniority gained as an AP. In addition, progressing to senior ranks for both officer and non-officer was highlighted as an issue regarding the availability of clinical postings at higher levels. Most senior ranks result in non-clinical postings to staff or command appointments. In addition, concerns about making an AP an officer-only position were raised.

The notion of tribes refers to different professional groups: doctors, nurses and paramedics. Participants highlighted further issues concerning interprofessional politics related to identity and roles when these tribes clash. Opinions concerning professional identity related to a perceived tribal mentality with individual roles. It was apparent that the pre-hospital AP role overlapped with each of the tribes, causing conflicts regarding role boundaries. Inter-professional dominance was noted among the APs and their position in the medical hierarchy. Concerns about where APs fit into the military PHEC levels were raised. Some APs felt restricted or boxed into certain levels of PHEC practice. From the below quote, AP2 uses the term 'antiquated', suggesting the military had not caught up with NHS and had a culture of outdated professional boundary restrictions.

AP2 *'I think. The military is. And the (single service), in particular, is still very antiquated in a lot of its roles and a regimented system, regimented to roles. A career pathway of what you should be at what rank.'*

The current military PHEC levels do not feature an AP role (see Figure 1). It was perceived during the interview that APs did not fit into the levels, further promoting a regimental culture. AP5 struggled to see the purpose of the levels. AP2 felt that the levels restricted practice as they were labelled into levels by their role and not skills.

AP5 *'I think I think they are meaningless, I am yet to work out any meaningful impacts that they have. And I think they are something that has been. It's a physician-centred set of levels…'*

AP2 *'I think the MERT course, for example, I got very frustrated. In terms of, that's a level eight job (clinical skill). that's a level-five job (clinical skill).'*

Theme 3: Exploring future roles and employment of military APs

Questions were asked that focused on the potential utility of APs for future operations in different deployed environments. Participants suggested a variety of capabilities and platforms that APs could employ to meet future operational challenges.

More specifically, participants could see a role for an AP working in remote treatment units such as Role 1 or Role 2 treatment facilities. It was felt that APs could deploy in place of a doctor delivering care to patients autonomously, providing treatment and stabilisation in austere locations before the patient is repatriated for definitive care in a larger hospital such as a Role 3 or 4 facility. Within these capabilities, participants felt an AP would add significant value during a prolonged field care scenario, where patients are held in an austere location for a significant time. Participants considered the additional skills that an AP has and if it would meet the needs of patients during their hold in this environment while awaiting retrieval back to a Role 3 facility.

DR2 *'So I think they have a huge role to play in what I would call role 1 pre-hospital emergency care. Clearly, they have a role to play as part of a medical emergency response team. But that's more on the doctor-paramedic-nurse model. But working autonomously, they have a Role in Role 1 pre-hospital treatment teams, definitely.'*

From a military PHEC perspective, utilising an AP at level 6 was viewed as increasing skill levels in autonomous working and decision making. Deploying APs in this role could mitigate risk, offering an additional capability and meeting a gap in ability between a level 5 (nurse/paramedic) or level 8 (PHEM consultant).

AP1 *'If you have advanced practitioners at a level six, they then sit in the middle of that bubble and provide the extra clinical decision making, clinical capability to meet those riskier ends of the operational spectrum where either we don't have a level eight team or we're not willing to deploy them because the risk is there isn't considered such a high risk.'*

An AP working in PHEC at level 6 could offer flexibility in supporting level 5 teams and providing mentorship. The role could be used as part of a 4-person level 8 team. Providing additional skills to manage multiple anaesthetised patients safely.

DR1 felt that although this had been done in the past without an AP, it lacked governance to ensure the process of moving multiple ventilated patients without a team specifically trained in this role.

DR1 *'I'm very keen to make sure that you know, we push that concept a bit on working with CCPs that if you have that second practitioner, you can actually do a lot more of what we would like to do and we have probably done in the past without that solid governance foundation like looking after multiple intubated patients.*'

Having an AP within a 4-person team could enable the team to be split into two capabilities of 2-person led teams (level 8 and AP-led teams). This would result in a capability that had additional effects in terms of increased lift of patients, with the bonus of spreading the clinical teams across a larger area.

DR4 *'You know, you can have a much bigger effect over a much bigger geographic area that you can necessarily have with one person. And as long as, well the benefit of the PHEC levels it's really clear, if you're a PHEC 5, 6, 7, 8, being able to split them up and cover a huge area is probably going to be the way forward.*'

Despite their proposed conceptual utility, concerns were raised about how the DMS could put these concepts to fruition.

P1 *'Absolutely, absolutely. 100% there is so much utility for them, we desperately need them be that in a PHTT (pre-hospital treatment teams, be that in company groups that are isolated operating out of small bases, be that in that MAB (special forces) world where they are desperately needed and would be utilised.'*

Discussion

This study has identified several critical issues related to the ongoing development and employment of military APs. Despite progress in formalising the AP role in civilian contexts, such as the NHS, the military context presents unique challenges that require a different lens.

Standardisation in training and career development

These findings align with previous research highlighting the need for clear career pathways and standardised training frameworks for military APs.[14] In civilian healthcare, the development of AP roles has been underpinned by structured academic and clinical pathways.[15] At the time of this study, the absence of a formalised strategy for military APs led to fragmented training experiences and career development, resonating with the challenges faced during the early stages of AP role development in the NHS, such as inconsistent training and unclear role identity. Since the interviews, significant progress has been made with the introduction of the 'Defence Functional Nursing Strategy' and the 'JSP 950 Advanced Clinical Practitioner Policy for Nurses, Midwives and AHPs', which provide a framework for standardising AP roles across Defence. These policies mark a significant step towards addressing the findings of this study; however, their full implementation within the workforce is essential to ensure they achieve their intended impact and translate into meaningful change.

Trust and role boundaries within multi-professional teams

Theme 2 highlights the impact of hierarchical structures and role boundaries on the professional development and autonomy of military APs. The military's rank-based system and the undefined scope of AP roles lead to tensions within multi-professional teams as APs struggle to gain the trust and recognition required to practice at their full potential. This issue of professional dominance from other roles is consistent with findings from civilian AP literature, where role boundaries and medical hierarchies have historically impeded the development of AP autonomy.[16]

The lack of clarity in role definitions further exacerbates these challenges, creating confusion and limiting the potential for APs to contribute to military operations fully. This study demonstrates that the military context, with its added layer of rank structures, intensifies these tensions, making it difficult for APs to navigate their roles. If left unresolved, these issues may threaten the retention of APs, as participants expressed concerns about feeling underutilised and undervalued if not employed as a military AP.

The Defence Functional Nursing Strategy and JSP 950 policies provide a foundation for standardising AP roles, offering clearer career pathways and formally recognising their contributions. If fully implemented, these policies have the potential to address workforce integration challenges, ensuring APs are effectively utilised, professionally supported and retained within the DMS.

The future role of military APs: utility and feasibility

Theme 3 explored the future potential of military APs, particularly in austere and remote operational settings. Participants agreed that APs could address gaps in the Operational Patient Care Pathway (OPCP), providing autonomous care in scenarios where doctors may not be available. This aligns with Bricknell et al.'s findings, highlighting the need for flexible and dynamic healthcare solutions in future military operations, including paediatrics, humanitarian care and prolonged field care.[17]

While participants recognised the utility of APs in Roles 1 and 2 and pre-hospital care, they also highlighted challenges in fully integrating APs into military healthcare due to a lack of clear policy and clinical governance at the time. Since then, progress has been made with introducing the Defence AP and functional nursing strategy to provide a foundation for standardisation. However, fully realising the potential of APs will require further efforts to align single-service operational requirements and establish robust governance frameworks.

Implications and contributions

This study highlights the unique challenges military APs face, including the lack of standardised training, unclear role boundaries and the impact of military hierarchies on their professional development. In response to these issues, recent policy developments for Defence AP represent significant steps towards standardising the AP role. However, given the scale and complexity of workforce integration, their success will depend on straightforward implementation and sustained strategic management. Without structured follow-through, there remains a risk that APs will continue to face role ambiguity, underutilisation and limited career progression, ultimately impacting retention and operational effectiveness.

There is broad recognition that APs could play a crucial role in addressing the logistical challenges of future military operations, particularly by bridging gaps along the OPCP and delivering autonomous care in remote and austere environments.

Limitations and future research

One limitation of this study is its focus on a small sample of military APs and non-AP personnel, which may limit the transferability of the findings to the civilian setting or other specialities such as general practice. The APs who were purposively sampled had deployed on PHEC operations, ensuring participants had relevant operational experience. However, the perspectives of those earlier in their AP training were not captured, which may limit the relevance of findings across the full AP training continuum. To put this into context, the RAF trains approximately one AP per year, depending on its workforce requirements. In addition, the non-AP group was drawn from the Defence Sub-Specialist Pre-Hospital Board, which provides oversight and policy advice on PHEC. While these participants offered informed and strategic perspectives, they may not fully represent frontline clinical views. Lastly, supported elements such as other combat teams or patients were not included, which may have provided different perspectives on the perceived utility and effectiveness of APs in deployed settings.

Further research is needed to explore the experiences of a broader range of APs across different military contexts and roles and to examine the impact of potential policy and training framework changes on the development and retention of military APs.

Conclusion

While the role of APs in civilian healthcare is well understood, their place within the military remains unclear. This study reveals that military APs, despite their advanced training, face significant challenges in terms of career development, role recognition and utilisation. Hierarchies within military and medical teams create barriers to trust and professional autonomy, further complicating their integration into military operations. To address these issues, UK Defence must continue the work that has begun to establish standardised career pathways, modernise its PHEC levels and align the AP role with the strategic vision outlined in current Defence policies. A comprehensive review of the workforce, focusing on skills rather than roles, will be essential to ensure that APs can meet the evolving operational needs of the UK Armed Forces.

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Utilising the Adapted Culture of Care Barometer to Monitor Soldiers' cConditions of Service During a Series of NATO Exercises

P G Schnadthorst, L Geerkens, F Weinreich

Abstract

Background: Working conditions have a significant impact on job-related performance, and in the military context, this can affect the outcome of exercises and missions. Therefore, the scientific recording and consequentialist improvement of soldiers' conditions of service is important.

Purpose: This study aims to contribute to a deeper understanding and potentially improve the wellbeing and performance of NATO soldiers in 1GNC.

Material and methods: This study is conceived as an anonymised, observational cohort study. During the command-post exercises STJU23, LOLE24 and AVTR24, the soldiers of the 1GNC were interviewed before and after each exercise. The adapted 'Culture of Care Barometer' was used as a measuring instrument to investigate the workplace-related strengths and weaknesses of 1GNC.

Results: The response rates were 34.8% (STJU23), 21.6% (LOLE24) and 24.8% (AVTR24). On average, the overall result for STJU23, LOLE24 and AVTR24 was a mean of 3.84/3.81 (pre/post STJU23), 3.89/3.81 (pre/post LOLE24), 3.75/3.69 (pre/post AVTR24) and a median of 3.87/3.87 (pre/post STJU23), 3.93/3.81 (pre/post LOLE24), 3.87/3.77 (pre/post AVTR24). The factor analysis detects a positive correlation for all factors. The highest values were achieved in factor 3 (relationships with colleagues).

Conclusion: Our study conclusively demonstrated that potentially stressful working conditions can be detected by using the aCoCB. Professional medical advice can support military leaders in fulfilling their duty to take care of the mental health of their soldiers. Furthermore, psychological factors have a significant influence on military tactical considerations.

Keywords: Culture of Care Barometer (CoCB), conditions of service, NATO exercises, 1 German-Netherlands Corps (1GNC).

Background

The 1 German-Netherlands Corps (1GNC) is a multinational high-readiness and warfighting headquarters within the NATO force structure. 1GNC is capable of rapid deployment in various fields of operations, including humanitarian aid and deterrence operations.[1] This NATO exercise series is tailored to current geopolitical events (particularly Article 5 scenarios) in order to improve structures and work processes. A key factor is the division and distribution of 1GNC's forces into several command posts (CPs) to reduce vulnerability and increase endurance, thereby maintaining leadership ability at the highest possible standard. Steadfast Jupiter (STJU23), Loyal Leda (LOLE24) and Avenger Triad (AVTR24) are simulation-based exercises involving the participation of several NATO Headquarters in which 1GNC takes part with different CP configurations. The soldiers face new challenges in every exercise and must constantly adapt flexibly to changing circumstances.[2,3]

These working conditions have a significant impact on our job satisfaction, productivity and effectiveness, which also applies to soldiers' conditions of service. In general, military missions are often complicated by external stressors, such as limited private communication, cramped living space without privacy, limited medical care, extended day

shifts and daily routines dictated by others. This lack of control and resulting reduction in performance can potentially jeopardise the mission's success. Human factors also play a crucial role in the military context, primarily when serving in a high-readiness warfighting NATO Headquarters such as 1GNC. This includes cognitive performance, mental and physical resilience and recovery strategies.[4-7] Research in the fields of space travel and submarine crews has provided important findings, as it has helped reduce the adverse effects through the selection of interpersonally compatible crews, pre-mission team training and the implementation of self-monitoring tools for psychological parameters. These findings can only be transferred to a limited extent to the situation of NATO soldiers in the Article 5 scenarios, because this extensive preparation might not be possible in this case.[8-10]

This paper aims to assess the soldiers' conditions of service by utilising an adapted version of the Culture of Care Barometer (aCoCB). The results of a previous study testing this questionnaire could already be used for optimisation within 1GNC. Ultimately, this research is intended to ensure that NATO's performance and functionality remain resilient.[11]

Methods

Study population

Multinational soldiers from 1GNC voluntarily participated in this study within the context of the NATO exercises STJU23, LOLE24 and AVTR24. We collected baseline parameters such as 'number of exercises' and 'years spent in 1GNC', which were each divided into three subgroups. No further basic data were collected to ensure the participants' anonymity. Anonymisation was achieved by generating an alphanumeric identification code that allowed individual questionnaires to be unmistakably assigned to a participant.

Design of the study

This study was conducted at multiple locations, depending on the CP structure within the framework of STJU23, LOLE24 and AVTR24. The data were collected at two points in time: during the immediate preparation for the exercise ('before') and in the last 3 days before the exercise ended ('after') for each exercise. Detailed information to clarify the study's aim was included in the questionnaires, and the accessibility of our working group to study participants was ensured to clarify any uncertainties. Inclusion in the study occurred after informed consent was obtained and the data were evaluated anonymously. The cohort was observed without blinding, randomisation or intervention. To assess and openly communicate the quality of this study design, we used the 'Risk of Bias in Non-randomized Studies of Interventions'-tool (ROBINS-I) and the level of evidence according to the Agency for Health Care Policy and Research (AHCPR).[12,13]

Culture of Care Barometer

The Culture of Care Barometer (CoCB) is used for benchmarking and exploring various aspects of care culture within organisations. This customisation ensures that the questionnaire resonates more effectively with the unique work environment and culture of 1GNC, leading to more accurate and relatable responses and capturing the conditions of service (adapted from the Culture of Care Barometer [aCoCB]).[11,14] Additionally, we performed a factor analysis on the following levels: factor 1 (organisational values—macro level), factor 2 (team support—meso level), factor 3 (relationships with colleagues—micro level), and factor 4 (job constraints—micro level). Each question was assigned a predetermined loading and applied to the factors. It includes 30 questions and the responses were rated on a five-point Likert scale from 'strongly disagree' to 'strongly agree' (1 ≙ strongly disagree; 2 ≙ disagree; 3 ≙ neither; 4 ≙ agree; 5 ≙ strongly agree). The wording of this questionnaire was adapted to suit the unique military context, work environment and culture of 1GNC better (Terms like 'co-workers' and 'organisation' were replaced with 'colleagues' and '1GNC'; 'line manager', 'colleagues' and 'managers' were changed to 'superior', 'comrades' and 'flag officers'). Additionally, we performed a factor analysis after predetermined loading on the following levels: factor 1 (organisational values—macro level), factor 2 (team support—meso level), factor 3 (relationships with colleagues—micro level) and factor 4 (job constraints—micro level).

Statistical assessment

Data collection was performed using Microsoft Excel 2023 (Microsoft Deutschland GmbH, Munich, Germany), along with preliminary graphical analyses, including the creation of box plots. Subsequent statistical analyses were conducted using R statistical software (R Foundation for Statistical Computing, Vienna, Austria). To assess the data distribution, we used the Shapiro-Wilk test, histograms and QQ plots, which indicated a deviation from normal distribution, leading to the adoption of non-parametric approaches for statistical evaluation. Furthermore, the Wilcoxon signed-rank test was used to assess the relationship between

dependent variables. Spearman's rank correlation coefficient (rho value) and Kruskal-Wallis H test (H value) were additionally employed for assessing statistical significance, with a threshold set at $p < 0.05$. Moreover, the effect size was estimated using Cohen's d, and paired t-tests were used where appropriate to compare dependent samples.

Results

Study population

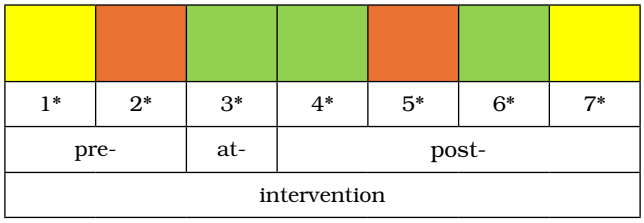
In each exercise, we distributed 250 sets of questionnaires. At STJU23, the results from 87 at LOLE24 54 and at AVTR24 61 questionnaires could be included in the statistical analysis (see Table 1). The detailed baseline parameters are also depicted there. The level of evidence is categorised as Level III based on the criteria established by AHCPR. The ROBINS-I tools' risk of bias indicates varying degrees across different categories: 3 instances of low risk, 2 of moderate risk and 2 of severe risk (see Table 2).

Table 1: Results of the baseline parameters

	Figure 2A: STJU23			Figure 2B: LOLE24			Figure 2C: AVTR24		
Participation rate	87 34.8%			54 21.6%			61 24.4%		
Number of exercises	15 17.2%	18 20.6%	54 62.1%	12 22.2%	12 22.6%	30 55.5%	9 14.8%	15 24.5%	37 60.7%
Years spent in 1GNC	32 36.8%	33 37.9%	2 25.3%	19 35.2%	20 37.0%	15 27.8%	17 27.9%	20 32.8%	24 39.3%

Illustration of the distribution of the baseline parameters (Participation rate, Number of exercises, Years spent in 1GNC), absolute number, percentage distribution shown below.

Table 2: Assessment of the risk of bias following ROBINS-I



1* confounding bias
2* selection bias
3* information bias
4* confounding bias
5* selection bias
6* information bias
7* reporting bias

Types of bias distinguished by time of occurrence (Pre-, at- and post-intervention):
green ≙ low,
yellow ≙ moderate,
amber ≙ severe,
red ≙ critical,
blue ≙ no information.

Figure 1: Results of the adapted Culture of Care Barometer

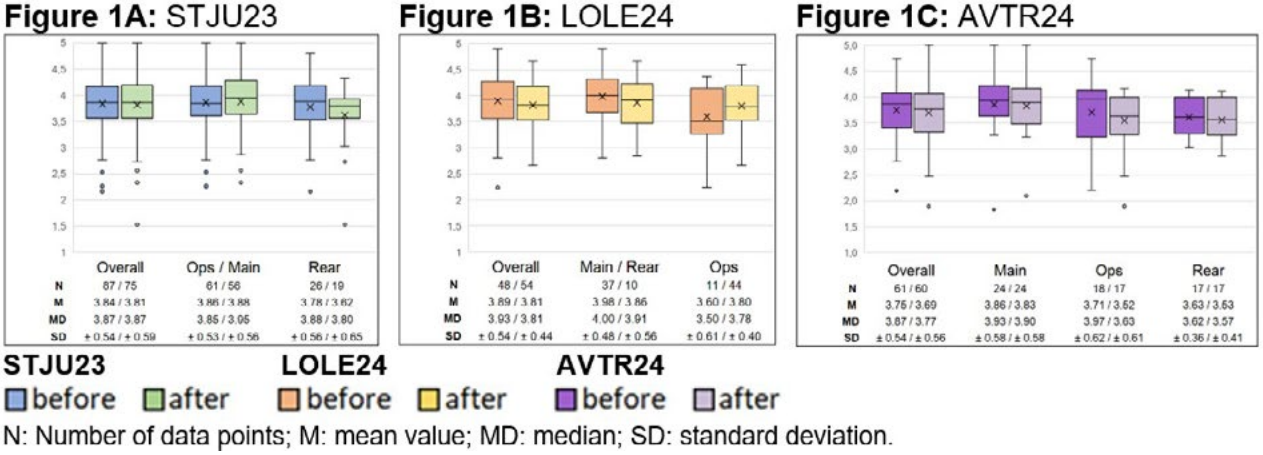
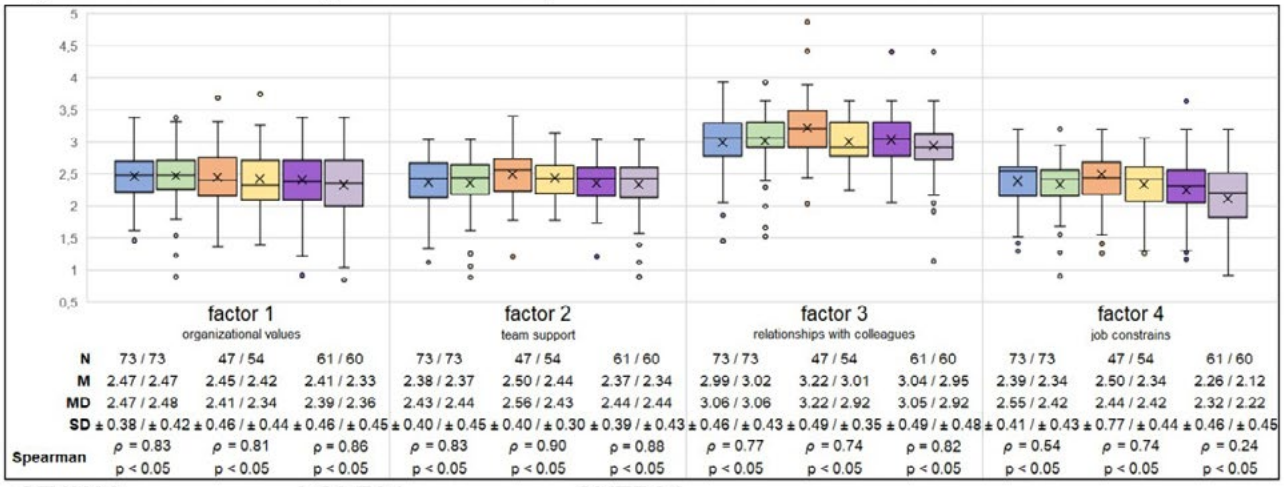
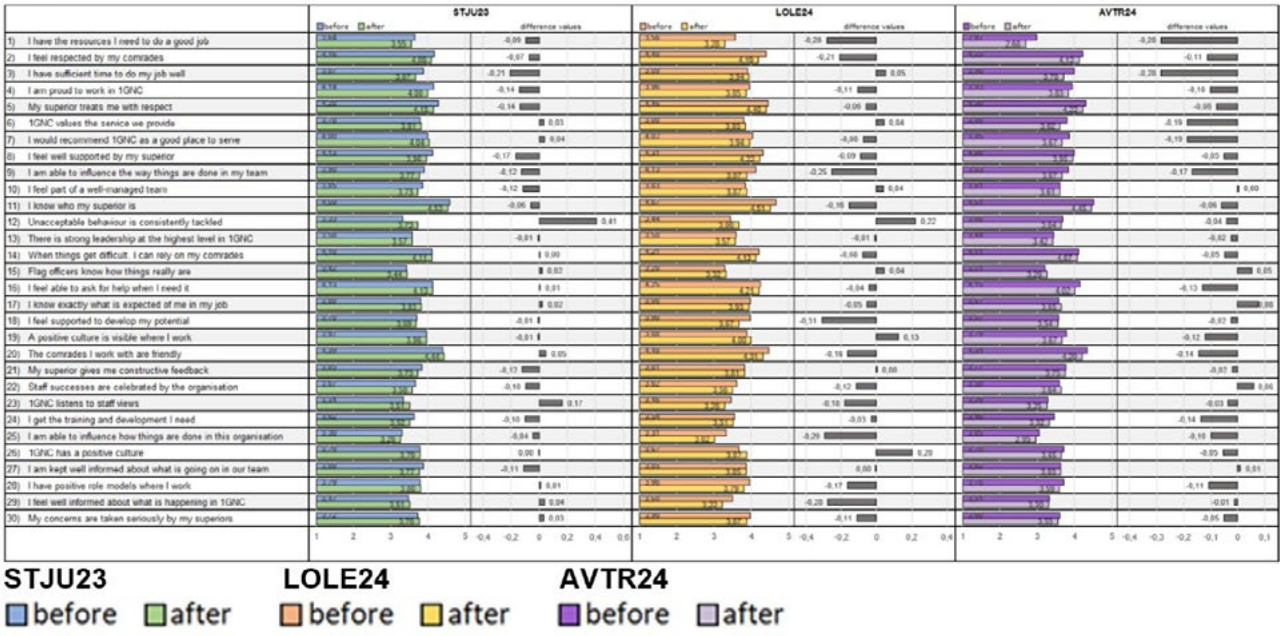


Figure 2: Factor analysis of the adapted Culture of Care Barometer



N: Number of data points; M: mean value; MD: median; SD: standard deviation; t: paired t-test; ρ: Spearman's correlation coefficient; p: null-hypothesis significance testing (p-value).

Figure 3: Results of the adapted Culture of Care Barometer - single questions



First column: single questions of adapted CoCB; second column: results before and after STJU23; third column: results before and after LOLE24; fourth column: results before and after AVTR24.

Adapted Culture of Care Barometer (aCoCB)

Initially, the study's results were categorised based on the three locations: Main (Bergen, Germany), OPS (Grafenwöhr) and the Rear (Grafenwöhr) (see Figure 1). A comparison of the average values of the aCoCB before and after the exercise revealed a statistical significant correlation in all localities. The WSR did not show a statistically significant trend in the average values before and after exercise.

Adapted Culture of Care Barometer—factor analysis

The statistical analysis of aCoCB's factors is presented below the figure (see Figure 2) and was created by summarising the questions and applying a predefined loading. All factors showed a positive correlation when comparing the mean values recorded before and after the exercise. The best results were achieved in the parameters of

factor 3 (relationships with colleagues). In factor 3 before STJU23, the mean value was 2.99, and the median was 3.06. After the exercise, the mean value increased slightly to 3.02, and the median remained unchanged at 3.06. No relevant changes in the mean value and median before and after the exercise could be detected.

Adapted Culture of Care Barometer—single questions

In addition to the overall analysis, we conducted a detailed examination of the responses to each question (see Figure 3). This approach allowed us to engage in more nuanced discussions with colleagues in 1GNC and to evaluate specific aspects of the battle rhythm and its impact on sections' service processes in greater depth.

Discussion

From 2023 to 2024, 1 GNC completed three NATO exercises (STJU23, LOLE24 and AVTR24). Our study assessed the mental status and conditions of service during the exercises by handing out the adapted Culture of Care Barometer immediately before and after the exercises. Unfortunately, the response rate was low in all three exercises. Most recently, the response rate during AVTR24 was only 24.4%. During exercise STJU23, a response rate of 34.8% was achieved. However, the lowest response rate recorded LOLE24 with only 21.6%. The low response rates affect both the informative value and the representativeness. One possible reason for the low participation and response rate could be the lack of an informative event. However, this was done on a small scale, at least in the AVTR24 main, with a brief introduction to the NCOs of each branch, in order to achieve the highest possible participation in the main. This may explain the increase in the response rate for AVTR24 in contrast to LOLE24. Generally, upon observing the mean, median and standard deviation, a consistent perception of working conditions was evident before and after the exercises, with slight but relevant differences. The mean value for STJU23 remained almost unchanged, decreasing slightly from 3.84 to 3.81. Whereas, the decrease in the mean value in LOLE24 turned out to be larger, with a change from 3.89 to 3.81. In AVTR24, the mean value decreased from 3.75 to 3.69. These small changes indicate that the general conditions and support structures were perceived as largely stable by the soldiers. The minimal differences could be due to the specific environmental conditions and stresses of the respective exercises. Interestingly, this is also reflected in the larger standard deviation difference between the comparison of before and after the exercise at LOLE24 (±0.54 / ±0.44). In contrast, the standard deviations for STJU23 (±0.54 / ±059) and AVTR24 (±0.54 / ±0.56) remained largely constant. This suggests that perceptions of service conditions varied more widely in LOLE24, indicating a broader range of experiences among the soldiers. However, the different perceptions could also be due to the different infrastructure and location at LOLE24, where both outdoor tent structures and fixed infrastructure were used. In contrast, STJU23 took place in a NATO bunker, where the conditions were constant and relatively controlled. At AVTR24, the conditions, at least in the OPS/REAR, were comparable to LOLE24. Whereas in the MAIN there were constant conditions and a fixed infrastructure. This controlled environment may have stabilised the perception of duty conditions, while the more variable environment at LOLE24, with outdoor CPs and changing weather conditions, led to different ratings. Studies show that extreme or isolated environments, such as Antarctica or submarine deployments, pose similar challenges to resilience and psychological wellbeing.[8-10,15] The results of the factor analysis support this. The differences in the factors 'relationships with colleagues' (factor 3) and 'job constrains' (factor 4), which show greater variability in LOLE24, are particularly striking. This could be due to the infrastructure and limited communication between the locations, which were more pronounced in LOLE24 than in STJU23. This suggests that interpersonal support and camaraderie bonds are less stable under difficult communication conditions. Such conditions can potentially increase the feeling of isolation and thus increase psychological stress, which negatively impacts soldiers' resilience.[4,5] Factor 4 (job constraints) relates to the necessary resources and clear objectives, and shows a higher dispersion at LOLE24 (±0.77 / ±0.44) than in comparison to STJU23 (±0.41 / ±0.43) and AVTR24 (±0.46 / ±0.45). This is indicative of the requirements in temporary outdoor CPs, which offer less structured duty conditions than a fixed NATO bunker, as in STJU23 or existing infrastructure predominantly in AVTR24. Such limitations in the duty environment could make tasks more difficult to perform and lead to an increased perception of stress. This underlines the importance of considering these factors in future planning. Adjustments such as improved communication structures, clearer allocation of resources and stronger team support could help to improve service conditions for soldiers and reduce psychological stress.

A detailed examination of the individual question analysis reveals further interesting patterns that point to specific aspects of the service conditions. In

the STJU23 exercise, there were only minimal changes in the rating of individual questions, which suggests a largely stable perception across the exercise. Particularly striking was the significant improvement in the question 'unacceptable behaviour is constantly tackled', which recorded a positive increase of 0.41. This indicates that the perception and addressing of problematic behaviours could be implemented more effectively within the controlled bunker environment. LOLE24 and AVTR24 exercises, on the other hand, show significantly higher fluctuations in the ratings of the individual questions before and after the exercises. The highest decreases were observed in the assessment of one's influence on team processes (LOLE24 -0.25 and AVTR24 -0.17) and one's available resources during LOLE24 and AVTR24 (-0.28 both). The most significant decrease was recorded for the statement 'I feel supported to develop my potential' by 0.31, while LOLE24 and the statement 'I have sufficient time to do my job well' decreased by 0.28. These specific deviations suggest that the conditions at LOLE24 and AVTR24, particularly the adaptation to temporary structures, made communication and the feeling of co-creation more difficult.[1] The individual question analysis thus confirms that the variable environmental conditions at LOLE24 and partially at AVTR24 led to a more critical perception in certain aspects of team dynamics and service support.

Conclusion

In summary, the data results indicate that the service conditions in all three exercises were rated as stable overall, although specific environmental conditions do influence perception. The slightly higher fluctuations and more variable perceptions in LOLE24 and AVTR24 suggest that a structurally uniform environment, as in STJU23, may lead to a more homogeneous and stable perception of duty conditions. These findings emphasise the importance of adapting support measures and resources to meet the special requirements of multinational deployments in order to sustainably promote the conditions of service and the wellbeing of soldiers.[7,10] In future exercises, increased structural and communicative support at deployment sites such as LOLE24 could help reduce perceived stress and increase consistency in the perception of service conditions.

In the future, NATO exercises should record the conditions of service and the resulting mental stress on soldiers, as these factors can have a decisive influence on service performance, the commander's effectiveness and warfighting capacity. Regular use of the aCoCB, along with self-critical reflection of the survey results, can help to strengthen organisational resilience, which is particularly useful in military units. Questionnaire-based surveys have been indicated to be suitable for further investigations.

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Black Measles during the Civil War

G D Shanks

Abstract

Black measles (*Rubeola nigra*) was understood to be an infrequent, severe subtype of measles defined by a very dark, nearly confluent rash in the 19th century. During the US Civil War (1861–65), measles epidemics killed many military recruits on both sides, with a case-fatality rate of 2%. Medical officers described black measles as appearing in the second week of illness and often leading to death. Black measles disappeared by the 20th century, and what clinical entity existed during the US Civil War is unclear. If one dismisses a faulty clinical diagnosis, the most likely explanation is a defect in cellular immunity due to nutritional deficiency or epidemiological isolation. Measles infections of rhesus monkeys show severe rash when CD8+ lymphocytes are suppressed. Rather than a historical footnote, black measles could be seen as a severe aspect of measles infection in an immunocompromised host.

Keywords: measles, US Civil War, historical epidemiology, immunocompromise, military

> *In the most dynamic cases the eruption is of a livid, reddish or blackish purple, scarcely modified by the pressure of the fingers. This is the variety which has been described as rubeola nigra, or black measles, and is particularly fatal.*[1]
> MAJ Joseph J. Woodward 1863

A majority of soldiers who perished during the US Civil War died from disease, primarily infections such as dysentery, typhoid, malaria and measles.[2] Measles was a particular problem in newly recruited soldiers as they often came from isolated farming communities and had not previously been exposed to this highly infectious respiratory pathogen. 'Camp measles' was so common that some commanders did not want to receive newly formed regiments until they had undergone the 'seasoning' as an almost inevitable rite of passage into the 19th-century military system.[1] Measles carried a substantial mortality rate or tax on recruits of about 2%, and some cases of particularly severe measles were labelled as black measles due to an almost haemorrhagic rash. It is uncertain what this clinical entity might be as there have been no reports of black measles in the 20th century. The historical records of the US Civil War have been examined in the light of modern pathology and immunology to suggest what our scientific predecessors might have designated black measles in the 19th century.

Woodward's description of black measles appears at the beginning of this article and is the most detailed, as most refer only to the great lethality of black measles. Outbreaks of measles often occurred before soldiers formally entered the military system, limiting published observations other than those scattered in soldiers' letters to family members. One epidemic that at least is said to have included black measles was reported in the Confederate Army in Camp Beauregard, Kentucky, during the winter of 1861, but the very high mortality list (up to 1500 out of 6000 soldiers overall, including measles) indicates that multiple pathogens were involved in this disease disaster. After 4 months the camp was evacuated and burned by its commander as a sanitary measure.[3] As the war progressed, there were fewer camp measles epidemics as the flow of recruits slowed with waning enthusiasm for what had become a grim war of attrition.[4] Measles killed many, including nearly 5000 Union soldiers, but so did other diseases, particularly of the gastrointestinal tract and black measles was largely forgotten as an extreme example of a recruit camp disease.[2] Medical officers of the US Civil War were handicapped by many pre-modern concepts of disease causation (e.g., miasmas), but were very competent clinical observers. Although it is possible that black measles was diagnostically confused with other severe infections such as haemorrhagic smallpox or meningococcal disease, neither of these was common either. It seems unlikely that a severe manifestation of measles was routinely misclassified if only because nearly all 19th-century physicians were very familiar with measles, and black measles was usually stated to be a later manifestation of the disease. An alternative view is that 'black' was an adjective applied to any severe infectious disease along the lines of the 'black death' and was only a designation of its serious, lethal nature.[5]

The historical understanding of rubeola nigra can be partially reconstructed from the pre-Civil War literature. A classical set of lectures on diseases of the skin from *The Lancet* list four types of measles, of which rubeola nigra was the least common and most

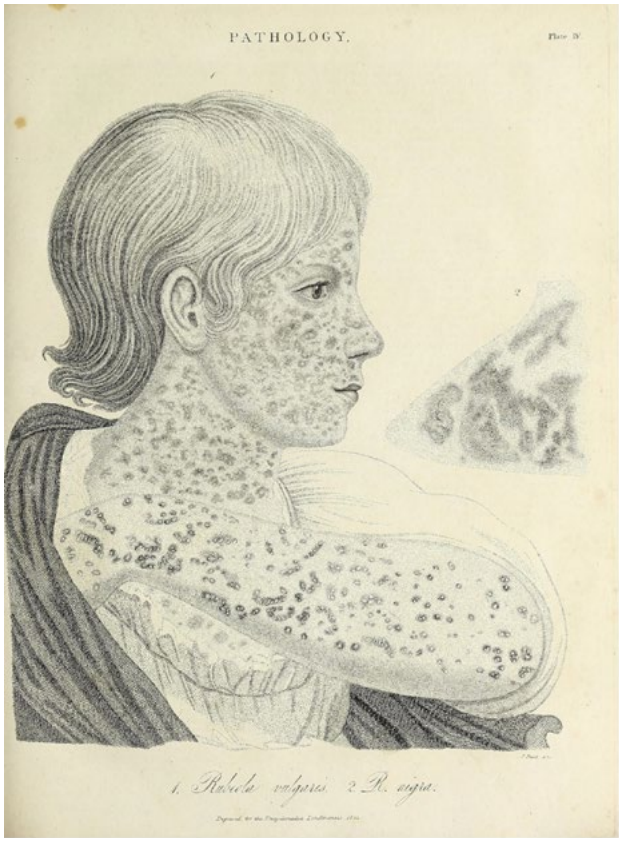

Figure 1: Engraving from 1823 showing both common (vulgaris) and an inset black (nigra) measles from the Encyclopaedia londinensis, John Pass engraver, now in the public domain.[7]

severe.[6] Repeating a previous authority, Rayer, in the 1842 lecture for medical students, black measles occurs in the second week of illness when the rash markedly darkens to deep purple, spreads beyond the pre-existing measles rash to become nearly confluent and is often associated with a bleeding phenomenon such as petechiae and ecchymoses. One of the few illustrations of this phenomenon comes from a British encyclopedia of 1823 (Figure 1) and has an inset said to contrast the rash of rubeola nigra with its common version (vulgaris). Other than being irregular and more confluent than rubeola vulgaris, it is hard to gather more from the figure than already stated in the text.[7]

Severe measles in military populations certainly existed into the 20th century, but it was primarily due to the recruit soldiers' susceptibility to secondary pneumonia following measles especially due to *Streptococcus pyogenes*.[8] Mortality and severe sequelae such as pulmonary abscesses resulted when measles patients were crowded into World War I hospitals in the pre-antibiotic era. Secondary bacterial pneumonia after measles was confided mainly to the winter in less crowded circumstances without generalised military mobilisation, indicating the importance of crowding on colonisation by bacterial pathogens causing secondary pneumonia.[9] Measles mortality progressively fell in the US Army over time as increasing population mobility increased childhood measles incidence and made adult measles an increasingly unusual event in the USA.[10] Despite the severity of measles in the US Army during World War I, there were no descriptions of black measles in the Official Medical History as during the Civil War.[11]

Measles is severe and often lethal in immunocompromised persons, including primary deficits such as children with congenital cellular immune defects and secondary immunocompromise due to protein-calorie malnutrition. Congenital immunodeficiencies and measles seem to be dichotomous because children with only humoral defects (e.g. agammaglobulinemia) manage measles infection relatively well, while those with cellular defects do very poorly.[12] Measles mortality is particularly severe in African refugee children suffering from malnutrition, and sometimes, the rash deepens to a deep red or purple colour. The type of measles rash in malnourished African children has suggested that black measles is actually measles in an immunocompromised person. However, it is not routinely designated as black measles, perhaps because of their darker skin colour.[13] Experimental measles infections in rhesus monkeys have been instrumental in working out the pathogenesis of the measles rash.[14] The measles rash occurs when lymphocytes and other immune cells interact with virally infected cells in the skin, usually two weeks after exposure to the virus. Children with little cellular immunity often have no rash during a severe measles infection.[15] Experimental infections in rhesus monkeys whose CD8+ lymphocytes have been depleted have severe measles rash, suggesting that an immune imbalance is the cause of phenomena such as black measles.[16]

Another aspect that may have played a role in the disappearance of black measles in modern times is severe measles in epidemiological isolated groups such as on Pacific Islands when measles first arrives in a non-immune population. One of the last such examples was the 16% population mortality resulting when measles first arrived on Rotuma in 1911.[17] Although mass mortality on islands during measles epidemics is primarily due to the inability of people to care for the many simultaneously ill individuals, measles mortality was noted to be characteristic of rural areas likely due to social isolation. Measles mortality in the US Army correlated between the US Civil War and World War I based on geography (rurality and US state).[18] The disappearance of rural

isolation as part of the process of globalisation might partially explain why black measles is no longer described today.[19]

So, what then was black measles as seen by the US Civil War medical officers? Unless one discounts their powers of clinical observation, black measles was a form of severe measles infection that is no longer commonly seen in modern times. The most consistent explanation of the rash is that it was due to some form of cellular immune imbalance, possibly due to malnutrition in the days before anyone understood micronutrients and balanced diets. Epidemiological isolation certainly contributed to the large number of adult measles cases seen in the military until the mid-20th century. However, it seems unlikely that black measles is just a rare manifestation of adult measles. The most consistent modern clinical picture of black measles is the same viral infection in malnourished African children, often with protein-calorie malnutrition in refugee camps.[13] It is, however, worth noting that such severe measles infections in refugee children during the Boer War 1899–1901 did not result in black measles but rather secondary pneumonia as the leading cause of death.[20] Measles-related deaths in Rotuma in 1911 were often due to subacute ileocolitis without any particular reference to severe rashes as part of the disease.[17] Systemic viral infections can result in anomalous findings in rare or abnormal hosts, likely the best explanation for black measles during the US Civil War. That one can at least partially reconstruct the history of black measles from observations that pre-dated any modern understanding of infectious diseases is a testament to the medical officers who struggled to care for their soldiers under unimaginably difficult wartime circumstances. Unusual clinical findings remain worth recording if only in the hopes that our scientific successors will better explain what we cannot currently understand.

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Military Mortality on Pacific Islands: Implications for Future Armed Conflicts

G D Shanks

Abstract

Future armed conflict in the Indo-Pacific region may see small detachments of soldiers deployed on isolated Pacific Islands for extended periods. Historical experiences with such deployments, particularly during World War II, are reviewed to give insight into possible medical problems and their countermeasures. The 8th Division of the Second Australian Imperial Force (2 AIF) is infamous for its experiences on the Thai–Burma railway. However, it also contained three separate one-thousand-soldier detachments which Imperial Japanese Forces destroyed on New Britain, Timor and Ambon. Crisis mortality (2%/month) was associated with cholera epidemics and forced labour periods under conditions with little food and many tropical infections, such as malaria. Many POW deaths were due to ship sinkings by Allied submarines. Some isolated garrisons, such as a Japanese Naval Battalion on Nauru, survived well until post-war repatriation exposed them to epidemic malaria. Medical preparations for isolated island garrisons need to focus on supplies of fresh water and rations, pre-deployment immunisation and chemoprophylaxis against scrub typhus and malaria. Lack of medical evacuation may present significant practical and psychological challenges for isolated island deployments in a future conflict.

Keywords: military, mortality, Pacific Islands, historical epidemiology

> *I find it difficult to overcome a feeling of disgust, and more than a little concern at the way in which we have seemingly been 'dumped' at this outpost position.*
> LTCOL Roach, Ambon 1942[1]

Geography often determines what is possible during armed conflicts. If war occurs in the South China Sea, a range of Pacific Islands will be involved, some of which may be held by small detachments of soldiers who will purposefully be isolated from direct support due to the extreme risk to any resupply or evacuation missions. This tenuous logistical chain is very different from most recent conflicts. One needs a historical perspective back to World War II to anticipate what might occur during future Pacific Island deployments. Detachments of the 8th Division of the 2 Australian Imperial Force (2 AIF) containing individual infantry battalions were posted to New Britain, Timor and Ambon in 1942. All were quickly overwhelmed and destroyed by the Imperial Japanese offensive.[1,2,3] It seems very likely that any future regional deployments will be small and inconspicuous to avoid such a fate. So, the question becomes, how does one medically prepare a company-sized unit for an extended and possibly indefinite stay on small Pacific Islands? Although infectious diseases such as malaria and scrub typhus have been critically important in the past, other types of casualties, particularly psychological, will likely be important in determining mission success in the future. We can try to anticipate the future, but this analysis is based on the past, as this brief historical review is taken from casualty figures primarily from the Official Histories and the Commonwealth War Graves Commission.

New Britain, Papua New Guinea

The 2/22nd BN formed most of the fighting strength of Lark Force on Rabaul in New Britain.[3] Most of the force were captured around Rabaul after the Japanese amphibious invasion of 23 January 1942, but about 400 soldiers escaped capture, evading along the coast of New Britain.[4] About 160 Australian soldiers who could no longer flee were massacred by Japanese soldiers of the 1 / 144th Infantry Regiment at the Tol Plantation. Nearly all the survivors developed malaria during their trek in the jungle, and it is estimated that 20% of them died of malaria when the medical officer ran out of quinine.[5] Eventually, 156 survivors were evacuated by the HMAS *Laurabada* to Finschhafen. It is estimated that only four hundred escaped out of a mixed military force of 1396 in Rabaul; barely a quarter of the 22nd Battalion survived the war. Most (849) of

the remaining Prisoners of War (POWs) from Rabaul died when a US Navy submarine sank the *Montevideo Maru* off Luzon in Philippines on 1 July 1942.[4] Even the pursuing Japanese soldiers did poorly with at least 5% of the 1/144th Regiment dying of malaria on New Britain prior to their transfer to Kokoda Campaign where the unit was destroyed.[6,7]

Timor and Ambon, Indonesia

The 2/40th BN was the core of Sparrow Force in Kupang, Timor and Dili in Portuguese East Timor.[2] A Japanese amphibious and airborne assault cut off the Australian and Dutch Forces on Timor, leading to most becoming POWs in February 1942, many being transported to Thailand or China. Eighty per cent of those remaining in the field were estimated to have malaria within a month. The 2/2 Independent Company AIF was able to conduct guerrilla operations until the end of the year, when it was withdrawn exhausted as it could no longer be supplied without unacceptable shipping losses from Darwin.[8]

The 2/21st BN was the infantry component of Gull Force on Ambon in the Netherlands East Indies (now Indonesia), originally commanded by LTCOL Roach, whose quote is shown at the beginning of this article.[1] Gull Force and Allied Dutch soldiers were overwhelmed by a Japanese amphibious assault backed by aircraft carriers on 24 February 1942. It is estimated that 800 Australian soldiers surrendered and that the Japanese massacred 300 around Laha airfield. Of the 532 survivors, 405 died in captivity of starvation and disease. Only about 300 members of Gull Force survived the war.[9]

Prisoners of War

Due to the circumstances of the comprehensive Allied defeat in 1942, with few surviving records, it is difficult to make detailed observations on POW mortality. Post-war information reconstructed by the Commonwealth War Graves Commission from Allied medical officers serving on the Thai–Burma railway provides sufficient data for the illustrative graphs.[10] Figure 1 shows that Allied mortality in Singapore was limited mainly to the combat phase prior to capture. Those soldiers staying in Singapore had relatively low mortality, consistent with other prison situations. In contrast, those POWs sent to the infamous Thai–Burma railway died in large numbers from malnutrition, mistreatment and tropical infections. Crisis mortality rates peaked at 2% per month in mid-1943 during cholera epidemics, repeated malaria episodes and overwork forced by the Japanese to complete the railway construction in October 1943.[11,12] Figure 2 shows that mortality on the Thai–Burma railroad in 1944–45 was relatively low, many of the weaker soldiers having already died during the railroad construction. Soldiers over 35 years died at a rate consistent with their proportion of the force. Officers and medical personnel were relatively spared, mainly because most were exempted from construction labour. Most sick POWs survived the war period if they remained in Thailand due to hospital camps offering surgical care, including life-saving blood transfusions from fellow POWs for chronic relapsing malaria.[13] Malaria was thought to be the direct cause of 4% of POW deaths and indirectly killed another

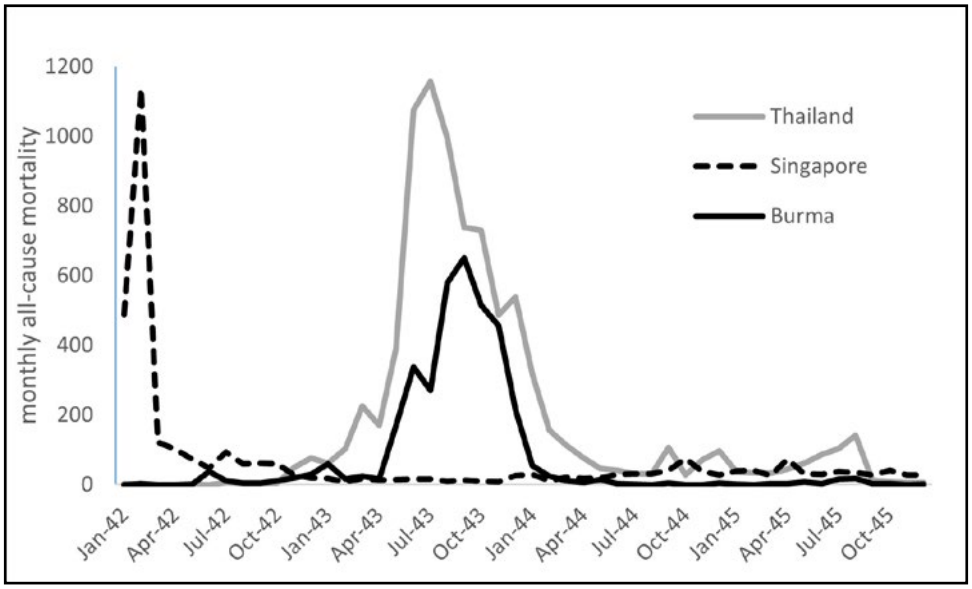

Figure 1: Statistics compiled from the Commonwealth War Graves Commission (https://www.cwgc.org/) for the Thai–Burma railway and Singapore cemeteries. All-cause mortality is shown, with the vast majority of combat deaths seen in Singapore prior to March 1942.

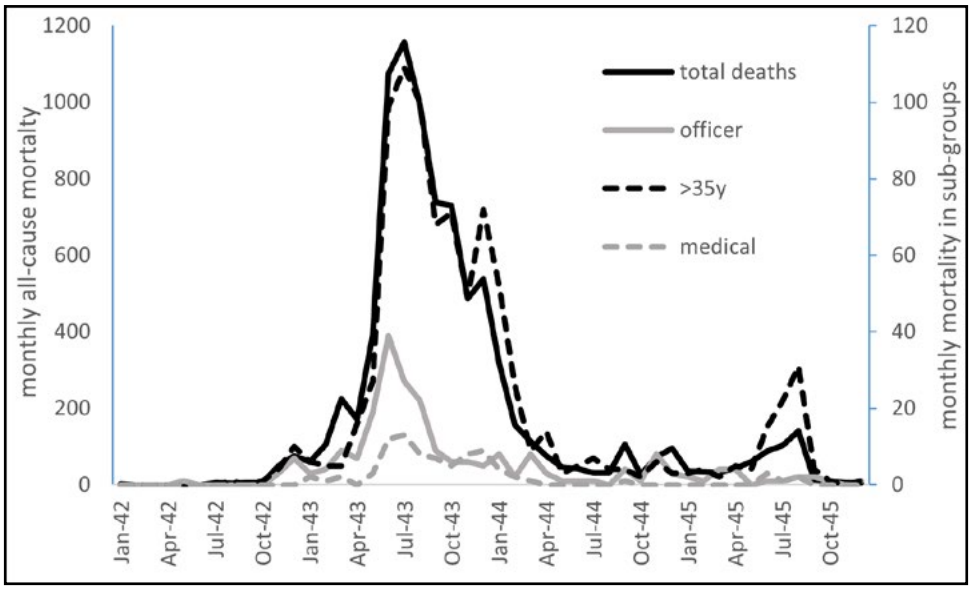

Figure 2: Statistics compiled from the Commonwealth War Graves Commission (https://www.cwgc.org) for the Thai–Burma railway and Singapore cemeteries. Total deaths shown with peak mortality of approximately 2%/month in mid-1943. Note that officer, medical personnel and soldiers >35 years mortality is shown on the right axis at one-tenth the scale of the left axis.

7%.[11] Scrub typhus was described as jungle fever and likely killed some POWs due to the absence of antibiotics. However, the leading causes of mortality were gastrointestinal infections, malnutrition, especially beriberi and chronic skin ulcers.[14] Mass mortality events accelerated overall mortality during submarine sinkings of 'fit' men shipped to Japan. It is estimated that 10 000 Australian soldiers of the 8th Division died during World War II, or two-thirds of all Australian war dead in the Pacific theatre.[10]

Other Pacific Islands

Other isolated garrisons in the Pacific were illustrative of specific infectious diseases. Bat Island, south of Manus, Papua New Guinea, was occupied by a joint Australian/USA observation unit of 41 men in 1944.[15] Within six weeks, scrub typhus had killed two and 26 others were sick (68%). The island, meant as a strategic weather/surveillance site, was abandoned as uninhabitable due to the large rodent reservoir of scrub typhus, a disease which was untreatable at the time. The Japanese Naval Battalion on Nauru Island was bypassed by the war, except for long-distance bombing raids.[6] Eight hundred men were transshipped to the Solomon Islands post-war camps in preparation for repatriation to Japan. Within two months of their October 1945 arrival, two-thirds of the Japanese had been hospitalised and 27% had died of epidemic falciparum malaria despite treatment in Australian-supplied, Japanese-run hospitals in the Shortland Islands. Malaria does not occur in Nauru due to the lack of an Anopheles vector, and the fact that these otherwise well Japanese prisoners were at severe risk of malaria was overlooked in the process of repatriating many thousands from New Guinea/Solomon Islands.[5]

Another major Australian military repatriation mission on Muschu Island collected the remnants of the Japanese 18th Army. It is estimated that 79% of the 18th Army did not survive the war, the vast majority due to starvation and infection, not combat losses.[16] Even after surrender to Australian forces

Figure 3: Captain L. Keeley RAAMC examines a sick Japanese soldier surrendered on Muschu Island, New Guinea, in late 1945. Many sick soldiers died after the surrender due to the combined effect of starvation and infection over many months in the New Guinea jungle. Photo 019273 Australian War Memorial now in the public domain.

in Sept 1945, 1008 of 13 000 Japanese survivors succumbed to illness despite Allied logistical efforts to provide food and medicines.[17] Figure 3. Like those on the Thai–Burma railway, their deaths were due to a composite of starvation, malnutrition (beriberi) and chronic infections with a variety of tropical diseases. Garrisons cut off from logistical supplies with minimal medical support did very poorly, whether Allied or Japanese.[16]

Conclusions

If future conflicts necessitate the deployment of detachments of soldiers on isolated Pacific Islands, some general statements and warnings can be made, assuming one is dealing with small units that are trying to remain hidden from the enemy. Uninhabited islands have no population for a reason, usually a lack of fresh water supplies. Careful thought needs to be given to drinking water supplies (desalination, coconuts), as it will be impossible to stockpile large amounts of water in a concealed manner. Drinking water is truly a non-negotiable logistics item, and history is replete with units made ineffective by using non-potable water sources. Soldiers can exist on minimal rations for several weeks, if necessary, but several World War II garrisons truly starved. POWs were very inventive in finding nutritional sources in tropical Asia, but that may not be possible on small coral islands. Fishing gear and supplemental vitamins to prevent deficiencies, such as beriberi, may be able to address the lack of other food supplies. Medical personnel will be limited to the unit medic, who will need to be very confident about independent medical decision-making, as it will not be possible to use telemedicine due to the need to suppress all electronic signatures. Medical evacuation will only be possible when missiles cease at the end of the conflict, necessitating consideration of methods to mark, record and respectful inter soldiers who die until their remains can be recovered later. Scrub typhus is likely to be a problem on small islands in the South China Sea.[18] The main regional malaria risk involves any of the major islands around New Guinea.[19] Doxycycline is a good preventive measure for both. However, weekly tafenoquine should be considered for highly malarious areas when soldiers are expecting weeks and not just days of night-time exposure. Lack of a cold chain will limit immunisations to pre-exposure use; therefore, planning similar to that used today for Special Forces on remote duty, with special consideration for Japanese encephalitis and rabies vaccines, should be employed. Psychological casualties are common in any war, but are likely to increase when soldiers who grew up with a mobile phone are suddenly disconnected from electronic media for months.[20] Based on this historical data from New Britain, Timor and Ambor in 1942, the ADF must be better prepared for the next Indo-Pacific conflict, and its medical officers should soberly consider what a high-casualty conflict would necessitate.

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We Dare Not Fail: Preparing Junior Military Medical Officers for 21st-Century Conflict

M H Remondelli, J Rhee, M Bradley, R Cole E A Elster

'The mothers and fathers of America will give you their sons and daughters…with the confidence in you that you will not needlessly waste their lives. And you dare not. That's the burden the mantle of leadership places upon you… It is an awesome responsibility. You cannot fail. You dare not fail…' – General H Norman Schwarzkopf, USMA Corps of Cadets, May 15, 1991

Just as General H Norman Schwarzkopf addressed the US Military Academy at West Point in 1991, reminding cadets that *character* and *competence* are inseparable pillars of leadership for the 21st-century battlefield, we currently face a similar inflection point. Then, the First Gulf War had just ended. Now, we again confront geopolitical uncertainty: the Russo-Ukraine conflict, continued instability in the Middle East and tension in the Indo-Pacific.

Yet, at an incredible pace, warfare is evolving. The future 21st-century fight will not mirror the wars in Iraq or Afghanistan. Instead, the next large-scale conflict is predicted to resemble a convergence of advanced weaponry and technology, leading to massive casualty numbers, prolonged casualty care and ethical ambiguity.[1] Military medical leaders will be expected to perform in the most austere environments, under constant stress and with limited resources, while simultaneously providing optimal combat casualty care to wounded warfighters. For military medical leaders, the mission remains the same: to conserve fighting strength. However, the tools, tempo and nature of warfare have changed. Therefore, junior military medical officers must be prepared to be clinically *competent* and have the *character* to lead through ethical adversity on the 21st-century battlefield.

The 'Walker Dip' and the Peacetime Paradox

Compounding these challenges during this interlude period is the unfortunate reality that military medicine is experiencing the 'Walker Dip' or 'Peacetime Effect'.[2] This phenomenon describes how trauma care capabilities and innovations surge during conflict and decline in peacetime due to reduced exposure and training opportunities. After decades of counterinsurgency operations, many trauma skills were refined and institutionalised. However, with decreased combat deployments and fewer casualties returning from abroad, there is now a growing concern about a perceived decreased proficiency among junior medical trainees.

This concern is not hypothetical. Future large-scale combat operations (LSCO) are expected to generate casualty volumes not seen since World War II, often in environments without reliable air evacuation or communication. Junior military medical officers may be called upon to deliver prolonged casualty care with minimal resources, far from definitive surgical assets and under direct threat. Without deliberate, realistic training in such conditions, the Walker Dip could leave our future leaders unprepared for the operational, clinical and ethical demands of LSCO. Overcoming this gap requires more than just classroom instruction—it calls for immersive experiences, trauma-informed readiness and leadership development embedded throughout medical education.

Character, competence and the future fight

While technology continues to transform warfare, the human element remains central to military medicine. The operational 'kill chain' may be accelerated by drones and artificial intelligence. However, the medical 'survival chain' still demands human judgement, compassion, and moral courage.[3] High-tech weaponry may shorten the time between identification and strike, but saving lives still depends on the steady hands and sharp minds of medics, corpsmen and military medical professionals operating in unpredictable environments.

Future military medical officers, therefore, must be prepared not only for clinical complexity but also for moral asymmetry. In modern conflicts, such as those in Ukraine and Gaza, adversaries have violated long-standing norms of warfare by targeting hospitals, attacking humanitarian corridors and disregarding

the Geneva Conventions. In a future large-scale combat operation, US military medical officers may be forced to operate in similar environments, where their commitment to medical ethics will be tested against battlefield chaos, resource scarcity, and the failure of adversaries to honour international law.[4]

Combat casualty care will no longer be defined by rapid evacuation and golden-hour surgical interventions. Instead, military medical officers must prepare for prolonged casualty care in environments marked by actual resource scarcity. Although moral complexity has always existed in trauma care, such as making decisions based on limited blood products or responding to reports of additional casualties who never arrive, LSCO introduces a fundamentally different challenge. In this context, medical providers may need to withhold life-saving interventions, not because the injuries are unsalvageable, but because the system cannot support the care required. Mass casualty triage may involve denying treatment to patients who would have survived under previous standards. The boundary between life-saving and life-sustaining care becomes even more challenging to navigate when decisions must account for both medical urgency and operational sustainability. Questions such as who should receive the final ventilator, whether a patient can be moved safely without air support, and when to initiate advanced care while anticipating additional casualties will define the ethical complexity of future warfare.

Moreover, junior officers will be expected to lead through these crises—navigating tactical uncertainty, guiding interdisciplinary teams, communicating with line commanders, and maintaining the moral and operational integrity of their unit. These responsibilities cannot be taught solely through textbooks or classroom lectures; they must be practised, challenged and developed through immersive simulation and ethical reflection. As the battlefield evolves, so too must our definition of readiness: one that accounts not only for clinical competency but for moral leadership, adaptability and character under fire.

As stewards of military medicine, we must ensure that these officers are equipped not only to stop the bleeding—a fundamental requirement—but also to lead with integrity when values and violence collide. They cannot rely solely on character, nor can they depend solely on competence. One without the other is not enough. In the words of General Schwarzkopf, they 'dare not fail'. To succeed on the 21st-century battlefield, they must have both.

Uniformed Services University: A military medical education and training case study

The Uniformed Services University (USU) provides a unique case study in preparing junior military medical officers for the demands of future LSCO. Often referred to as the 'West Point of Military Medicine', USU integrates military culture, operational readiness, and medical science into a cohesive and longitudinal curriculum. Its mission, to develop clinician-leaders of character prepared to serve across the continuum of military operations, is operationalised through an educational model that embeds military-specific training alongside rigorous clinical instruction.

At the core of this model is the Military Unique Curriculum (MUC), a longitudinal framework that scaffolds operational content across four years of undergraduate medical education. The 750+ hour MUC incorporates modules on expeditionary medicine, military medical ethics, health service support planning and joint force interoperability. Throughout the MUC, more than 400 mission-critical Knowledge, Skills and Abilities (KSAs) have been identified and strategically placed to ensure the readiness of junior officers as a part of the Joint Expeditionary Medical Officer (JEMO) project.[5,6] These components are intentionally aligned to develop both clinical competence and leadership capacity within the unique ethical, logistical and tactical demands of the operational environment.

One of the signature experiences in USU's MUC is Operation Bushmaster, a five-day, field-based capstone exercise designed to simulate the realities of combat casualty care during LSCO.[7] Students operate in a simulated austere, far-forward environment characterised by mass casualties and limited resources. Under conditions of stress, fatigue and moral complexity, they are expected to lead medical teams and make high-stakes decisions within the fog of war. Students are assessed not only on their clinical competency but also on their leadership, adaptability and character. The inclusion of allied and international partners in these scenarios further prepares students for joint operations in coalition environments.

USU also emphasises ethical preparation for warfare through case-based learning on combat decision-making, dual loyalty, and medical responsibilities in complex and contested environments. These discussions underscore the imperative for moral clarity and ethical reflexivity in future conflicts that are likely to involve prolonged casualty care, triage under fire and shifting mission priorities.[8]

Graduates of USU enter the Military Health System not only as licensed physicians but also as commissioned officers equipped to practice medicine in austere, high-threat and ethically ambiguous settings.[9] Their training reflects a deliberate investment in readiness: clinical competence, leadership under pressure and the capacity to deliver care in the face of uncertainty. As such, USU offers a model of military medical education tailored to the operational realities of LSCO and the evolving character of 21st-century warfare.[10] This model is well-positioned to inform the next phase of military medical education by shaping Graduate Medical Education programs that sustain a ready pipeline of military medical officers for the battlefield. For example, the Walter Reed/USU Department of Surgery residency program includes an MUC with a cadaver-based procedural curriculum, point-of-care ultrasound training, hands-on bowel and vascular anastomosis simulation courses, and combat craniofacial trauma courses. These initiatives are being refined for expansion across all military GME programs, providing a scalable model to sustain a battlefield-ready pipeline of military providers aligned with the demands of LSCO and 21st-century conflict.

Conclusion: We dare not fail

The preparation of junior military medical officers is not a peacetime luxury—it is a wartime necessity, undertaken in advance of conflict. As new threats loom on the horizon, military medicine must anticipate and adapt. This includes preserving combat casualty care skills, embedding ethical leadership throughout training, and embracing simulation-based training that mimics the complexity of LSCO.

General Schwarzkopf's warning still resonates: 'You dare not fail'. For military medical leaders, failure is not an option—not because perfection is expected but because lives will depend on their preparation, judgement and integrity. In shaping the next generation of military medical officers, we must match that urgency. We dare not fail.

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Supporting Australian Veterans Presenting with Cognitive Concerns

Dr Dan Corkery, Senior Medical Officer – Health, DVA

Introduction

Veterans frequently present to general practitioners and non-GP medical specialists with concerns regarding mood, thinking, memory, cognition concerns and in some cases even self-diagnosed dementia. Often, the underlying cause is unclear. The differential diagnosis might include an undiagnosed mental health condition, a sleep disorder, impacts from alcohol or drug use, dementia, a degenerative neurological condition or even just normal forgetfulness.

There are a number of DVA supports available to differentiate and manage cognitive concerns such as access to funded assessment, treatment and mental health services. Understanding what support veterans can access, as well as the intersection between cognitive concerns and military service can help providers ensure veterans receive the right care at the right time.

Dementia in the Australian context

Dementia is often the number one concern of veterans presenting with cognitive issues. Dementia is defined as a syndrome characterised by cognitive decline impacting a range of daily functions. While there are a number of causes of dementia, the most common cause in Australia is Alzheimer's Disease.

In 2024, dementia overtook cardiovascular disease and cancer to be the biggest cause of death in Australia, accounting for over 17,500 deaths. Dementia deaths have increased by 39 per cent in the last decade; this is partially due to reduced deaths from other causes and the fact that more Australians are now likely to live to an age where they have a higher risk of developing dementia. Dementia is more common in women, and changes in ADF recruiting and the workforce means there are greater numbers of female veterans than ever before.

Age is the main risk factor for dementia, while other risk factors include physical inactivity, hypertension, diabetes, alcohol use, tobacco use, hypercholesteremia and severe head trauma. Hearing loss and vision loss, educational attainment, job complexity and social status all play a role, as do mental health comorbidities. Genetics play a role in a number of types of dementia; however, direct inheritability is only relevant for rarer types (e.g. Huntington's disease).

Cognitive issues and veterans

While dementia remains an important differential diagnosis for veterans with cognitive concerns, many veterans symptoms stem from other treatable causes. Co-morbid mental health conditions including post-traumatic stress disorder, anxiety, depression and substance use can all mimic or worsen cognitive symptoms, while pain and sleep disruption, which are both highly prevalent in the veteran population, can also impact cognition. Changes in identity and difficulty navigating the health system, as well as social isolation, can delay help-seeking or exacerbate symptoms for some veterans.

Work up and management

Management aims at arriving at a diagnosis and treating the treatable such as optimising diet, sleep, alcohol and drug intake and linking to appropriate clinical and support services.

As with most conditions a thorough physical examination and comprehensive social and medical history are the foundation of diagnosis. For veterans this should include targeted questions on military service including details of any head injuries. Elapsed time since injury, and serial review is often used to aid diagnosis. Longitudinal relationships with family, carers and clinicians can help detect and monitor cognitive changes before testing. Cognitive deficits can be subtle and sometimes require comprehensive neuropsychological review.

Rationalising medications (including alternative therapies) can often improve cognition. Polypharmacy, especially of psychotropic and sedative medications can cause impaired cognition and balance, with an increased risk of falls. Regardless of the level of cognitive impairment improved control of risk factors such as alcohol intake, smoking, glucose levels, blood pressure and lipids is important. Minimising further brain insults can alter the overall trajectory. After all, we have only one brain.

Low level blast exposure

Some veterans may raise concerns about exposure to repetitive low level blast exposure. The impacts of repetitive low level blast exposures on the brain is an area of emerging understanding and is an area of active global research. DVA has commissioned the University of New South Wales to conduct a rolling literature review of the evidence on the neurocognitive effects of low-level blast exposure as part of our commitment to monitor current and emerging evidence

Recommendation 61 of the 2024 Royal Commission into Defence and Veteran Suicide was that a brain injury program be created to better understand and mitigate the impact of repetitive low-level blast exposure on brain processes and to assess and treat neurocognitive issues, whatever their cause. The Government agreed to this recommendation in principle and referred it to the Royal Commission Taskforce for further consideration. Government is currently considering the Taskforce's report. To inform DVA and Defence's response to Recommendation 61, a joint Brain Injury Expert Advisory Panel has been established that brings together medical and scientific experts who research, diagnose and treat brain injuries and other neurocognitive conditions. The EAP is meeting biannually to consider topics relevant to DVA and Defence's work on brain injury prevention and program development and provide advice.

Veteran Brain Bank

For veterans and clinicians who wish to contribute to anatomical and pathological research, the Australian Veterans Brain Bank is seeking postmortem tissue donations.

This effort mirrors those of Five Eyes partners to create a mass of histopathological material to scientifically study and better understand neurological conditions and exposures affecting Australian veterans. Enrolled veterans complete lifestyle questionnaires, medical imaging and exposures and history to support future findings being linked to known risks.

Summary

Overall brain health is affected by the lifelong accumulation of past environments and exposures. When veterans and their families present with cognitive concerns providers can access DVA funded comprehensive supports and services to support assessment, investigation, referral and management, ultimately improving outcomes for veterans.

DVA supports

DVA funds a wide range of interventions that can be used in the assessment and management of cognitive concerns. These include:

- funded medical consultations
- access to funded psychology and allied health supports
- specific item numbers (VC40 and VC41) for neurocognitive testing for veterans (Prior Financial Approval is not required for these)
- medications (via the RPBS)
- relevant home supports and aids and appliances (RAP), and
- counselling and support services offered through Open Arms (1800 011 046) - 24 hour a day, 7 days a week.

Providers should note that all veterans with a White Card are eligible for mental health treatment (including cognitive assessment) under Non-Liability Health Care, Mental Health.

References and Resources for Clinicians

- Cognitive Concerns quick guide for clinicians (NOV 2025) https://www.dva.gov.au/providers/provider-news/dvas-new-quick-guide-for-providers-on-dva-funded-supports-for-veterans-with-cognitive-concerns
- mTBI and repetitive Low Level Blast Veteran Fact Sheet ohttps://www.dva.gov.au/sites/default/files/2025-12/mTBI-fact-sheet-veterans.pdf
- Dementia Australia www.dementia.org.au/
- 2024 Royal Commission Into Defence and Veterans Suicide https://defenceveteransuicide.royalcommission.gov.au/
- DVA Brain Injuries Information Hub www.dva.gov.au/what-we-help-with/health-support/injury-or-health-treatments/brain-injuries
- Open Arms https://www.openarms.gov.au
- Veterans Brain Bank www.veteransbrainbank.org.au
- RACGP Silver Book (Aged Care) www.racgp.org.au/silverbook

More on the Staff of Asclepius

J Frith

In a 2010 issue of *ADF Health* I wrote an article *More on the Staff and Serpent of Asclepius* (1) describing Asclepian medicine and the Asclepian Temples with a short description of the wooden staff and entwining serpent of Asclepius. At the time I had not found any information on the origin, symbolism or nature of the staff, other than a staff was usually carried by itinerant physicians and philosophers and that it represented a person of knowledge and wisdom. Recently I have come across some references in relation to the staff.

I had always thought the staff was made of wood from an orange or olive tree as both grew prolifically on the island of cos, but in retrospect, their branches are too thin and straggly. Some references have simply referred to the staff as a "rough hewn branch". (2) Annette Giesecke in her 2014 book *The Mythology of Plants: Botanical Lore from Ancient Greece and Rome* states that the staff of Asclepius was made of cypress wood. (3) The cypress tree was a symbol of death and mourning to the ancient Romans, being a hardwood it was used for sarcophagi, it was planted in cemeteries and adorned graves, and burned as incense in cremations. It was also sacred to Apollo, the Roman and Greek god of healing, as well as Diana, Aphrodite, and Apollo's son, Asclepius, and the cypress did represent health, beauty and rejuvenation in other cultures. In ancient times, the Mediterranean or Italian cypress, *Cupressus sempervirens* (L. Cyparissus = a mythical youth, a lover of Apollo from the island of Ceos, who was transformed by Apollo into the cypress tree after the youth was grief stricken for accidently killing his pet sacred stag and so the youth might mourn eternally, sempervirens = "always vigourous or green" (4)), originally native to the mountains of the Middle East and Asia Minor, was prolific in Italy, Greece, and particularly the islands of Cos and Delos where Asclepian disciples, and later Hippocrates, practised the art of *physik*, or healing, the art of returning a sick person back to their natural state of health.

There are other unsubstantiated theories about the origins of the staff and serpent, (5) One theory relates to the Egyptian Ebers papyrus which describes using a stick to wind around and extract parasitic worms like the Guinea worm, and the symbol of the worm around a stick was used by Egyptian physicians to advertise their skills. Another is the biblical theory which relates to Moses who carried a bronze staff around which entwined a serpent and was used for healing.

However, I think that the most logical explanation is that the wooden staff represented Asclepius as a knowledgable and wise person as was typical at the time, and that it was made from a branch of the cypress tree both because it was a hardy and prolific wood on cos, and because it was sacred to Apollo and Asclepius.

The origin of the serpent is much clearer. Since antiquity the serpent has represented magic, healing, rejuvenation and longevity, probably related to its ability to shed its skin and renew, and was symbolic of medicine not only in Roman and Greek times, but also Sumerian, Egyptian, Minoan and Mycenaean cultures, and in ancient Indian and Chinese cultures. The venom of the viper was used to treat erysipelas, measles, smallpox, lepsosy, and skin disorders. The serpent used by Asclepian disciples in their healing temples, the *Asclepieia*, was *Zamenis longissima* (Gr. zamenos = "great strength", longissimus = "very long"), a non-venomous snake and member of the *Colubridae* family of constrictors native to Europe, its common name is the *Aesculapean snake.* The Asclepian healer would put the patient to sleep, sometimes using soporific substances such as opiates, in a small square room, a *cubiculum,* with the front open to the courtyard of the temple, and allow the serpent to lick the patient's eyes to induce dreams in which the patient would be visited by the god Asclepius, and which were interpreted later by a priest when the patient awoke to formulate their diagnosis and treatment. Asclepian medical treatment centred around purification, religious rites and offerings, and holistic remedies, and included diet, abstinence from alcohol, purgatives and emetics, exercise, massage, mineral baths, herbal medicines, and prayers to the gods of Apollo, Asclepius, and Asclepius' daughters, Panacea and Hygeia.

Regards,

John Frith RFD
Commander RANR (Rtd)

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