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<u>ABSTRACT</u>

FACULTY OF ENVIRONMENTAL AND LIFE SCIENCES

<u>School of Health Sciences</u>

An exploration of the role of military advanced practitioners and their potential employability in deployed pre-hospital operations: a mixed-methods study

ELIZABETH PAXMAN ARRC

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Background Prior research and my clinical experience in the UK civilian sector have indicated the potential benefits of incorporating the Advanced Practitioner (AP) role within the UK Defence Medical Services (DMS). This role could benefit Defence Medical Services during Operations, particularly in delivering pre-hospital emergency care (PHEC). The Defence Medical Services has trained a limited number of APs to date, but there is little research to define their operational role, specifically in relation to the contribution to deployed pre-hospital care. The thesis examines the skills required for Level 6 pre-hospital emergency care in military settings, including clinical and non-clinical competencies. It then explores the specific responsibilities of military Advanced Practitioners in their current roles. Lastly, it investigates the opinions of military pre-hospital personnel regarding the current and future significance of the AP role in military PHEC settings.

Methods The research study employed a two-phase, mixed-methods design using a Delphi study and a qualitative interview study. Firstly, an in-depth literature review was conducted to synthesise existing knowledge on AP roles and to identify pre-hospital skills relevant to advanced pre-hospital practice. This informed Phase 1 of the study, a Delphi survey. A four-round iterative electronic survey was administered to 26 purposefully sampled Defence subject matter experts. The survey combined open-ended questions, Likert scales, and short answer boxes to determine which Faculty of Pre-Hospital Care competencies should apply to PHEC level 6.

Phase 2 consisted of semi-structured interviews which explored the experiences of ten military APs who had deployed in pre-hospital operations. A further 12 interviews were conducted with pre-hospital multidisciplinary team members to examine

perceptions of military APs and their potential contributions to military pre-hospital care. Both sets of interviews built on the findings of the Delphi study. Themes from the interviews, combined with Delphi study results, were triangulated in the mixed-methods analysis to provide a comprehensive understanding to answer the research questions.

Findings The findings from the Delphi study indicated that APs in PHEC should possess skills such as sedation, independent blood administration, ultrasound, and advanced airway management. However, the Delphi study did not achieve consensus on some skills, including intubation and chest drain insertion. Qualitative interviews explored the experiences of military APs and perceptions of those working in the field. Three main themes emerged: current experiences and support for military APs; working relationships and role understanding within professional groups; and the future of military APs, including challenges, ideas, and concepts for employment. The absence of an employment strategy complicated working relationships, but participants perceived there were benefits of a military AP role.

Conclusion Nurses and paramedics are increasingly expanding their scope of practice in emergency and PHEC settings within the NHS. The study provides evidence that introducing APs to military PHEC could offer benefits in the Defence setting. These roles offer personnel with extensive clinical knowledge and experience, enhancing flexibility and resilience for deployed teams.

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Dedication

This PhD submission is dedicated to the memory of my father, Michael Wright, who died suddenly on the 13th Nov 22. When I started this journey 5 years ago, I never expected I'd come out the other end without my dad. He fully supported me throughout, and I know he would have been proud to know that I finished this work.

Acknowledgements

Definitions and Abbreviations

ACP Advanced Clinical Practitioner

AHP Allied Healthcare Professional

ALS Advanced Life Support

ANP Advanced Nurse Practitioner

AP Advanced Practitioner

APhecP Advanced Pre-Hospital Care Practitioner

CCP Critical Care Practitioner

CCFP Critical Care Flight Paramedics

CPD – Continuing Professional Development

DMS Defence Medical Services

EMT Emergency Medical Technician

eFAST Extended Focused Assessment with Sonography for Trauma

FPHC Faculty Pre-Hospital Care

GMC General Medical Council

GP General Practice

HCPC – Health and Care Professional Council

HEE – Health Education England

MEDEVAC Medical Evacuation providers

MERT Medical Emergency Response Team

MO Medical Officer

NMC – Nursing and Midwifery Council

NHS National Health Service

PHEA Pre-Hospital Emergency Anaesthesia

PHEC Pre-Hospital Emergency Care

PHEM Pre-Hospital Emergency Medicine

POCUS Point of care ultrasound

RAF Royal Air Force

Chapter 1: Introduction

1.1 Introduction

This thesis investigates the role of military Advanced Practitioners (AP) and their potential utilisation in deployed pre-hospital emergency care (PHEC) operations. The study investigates the clinical skills required by people operating in this role and explores recent experiences of military APs in both deployed and peacetime environments. In addition, the study investigates the perceptions held by Defence Medical Services (DMS) pre-hospital personnel of APs working in this field. The study is a mixed-methods design comprising quantitative and qualitative sequential phases. This thesis focuses on exploring the role of military Advanced Practitioners (APs) and their potential contributions to pre-hospital emergency care (PHEC) operations. The study aims to investigate the specific clinical skills required by individuals in this role and to gain insights into the recent experiences of military APs in both deployed and peacetime settings. Additionally, the study aims to explore the perceptions held by pre-hospital personnel within the DMS regarding the role of APs in PHEC.

To achieve these aims, the study adopted a mixed-methods sequential design, incorporating a quantitative phase followed by a qualitative phase. By employing a mixed-methods approach, the study aimed to provide a comprehensive understanding of the role and potential deployment of a military AP for PHEC operations. The research findings will contribute to providing insight towards AP development within the DMS. The findings from the study have offered the opportunity to assist with informing DMS stakeholders to guide towards shaping a potential future for military PHEC APs within the workforce.

Advanced Practice is an evolving level of clinical practice in healthcare, resulting in new roles for nursing and allied healthcare professionals (AHPs), including paramedics, pharmacists and physiotherapists. Healthcare professionals working at this level are trained to work autonomously, developing skills and knowledge to operate beyond their previous scopes of practice. These practitioners have Masters level educational awards, and after specialist clinical training, they are collectively known as Advanced Clinical Practitioners (ACP), Advanced Practitioners (AP) or Advanced Nurse Practitioners (ANP) (NHS, 2017). This nomenclature is discussed in further detail in chapter 2.

The NHS has seen a surge in advanced roles, with earlier reports highlighting advantages of the AP role that included increasing the skill mix across the team, providing resilience to workforces and offering a clinical development pathway (NHS, 2017). The pace of civilian AP is growing rapidly in various healthcare sectors (Pearson, 2011, Nuffield, 2023, Reynolds & Mortimore, 2021). The positive impact of these advanced roles is seen in primary health care with the management of long-term illness and in secondary healthcare as a solution for medical workforce gaps (Nuffield, 2023, Pearson, 2011). In addition, AP roles within the NHS have been developed alongside a sustainable clinical development pathway which offers career progression, role identity and standardisation, incentivising clinicians to remain in clinical-facing roles (Reynolds & Mortimore, 2021). The development of AP roles within the NHS has seen tangible benefits represented in the form of a strategic workforce response that has met a variety of challenges for the NHS (Reynolds & Mortimore, 2021). The roles of civilian APs are expanded on further in Chapter 2.

This growth in civilian APs has led to the Army, Navy and Royal Air Force beginning to train a small number of nurses in Advanced Practice for clinical development in around 2010. However, their deployed role is yet to be defined. Deployment refers to the moving of Armed Forces personnel for a period that exceeds 24 hours. This could be in support of an armed conflict, humanitarian operation or support to civil authority. Examples include deployed forces in Afghanistan or medical personnel assisting the NHS during the COVID-19 pandemic.

The deployed use for APs remains stagnated for several reasons. First, the absence of an Advanced Practice strategy and policy for the career management of existing military APs has impacted on the employability of APs after completion of training. Second, there is limited available research on military APs to inform Defence strategy. Consequently, the role of APs within the DMS has not been clearly identified.

Alongside the absence of a deployed function for an AP is an absence of strategic career management or employability outside of deployments (Paxman et al., 2021). This is associated with limited job satisfaction, which invariably will impact retention. Furthermore, for APs who are trained, the lack of a career pathway in the military results in reduced opportunities for further training and CPD, which are afforded to civilian APs. This will likely impact progression and growth within the role (Twine, 2017; Lawler., et al., 2022). This, in turn, has implications for skill fade, leading to compromised patient care.

APs work in clinical leadership positions within a career structure that empowers them to perform at this level. Without a definition and a defined role, this may impact on confidence and credibility to manage and lead with patient care, which threatens autonomy. Furthermore, the underutilisation of military APs could further exacerbate

recruitment and retention, particularly in military PHEC, where historically, attracting nurses and paramedics in this field has remained a challenge. Without a specific operational need for an AP, there remains confusion around what their contributions are, or have the potential to be, within the DMS workforce. The identification of an AP role for deployments would likely drive the need to deliver in the workforce and inform a DMS AP strategy. Within the literature, civilian APs have progressed further forward when compared to the DMS (Pearson., 2011., Nuffield., 2023., Reynolds & Mortimore., 2021). APs have increased across the civilian workforces from a variety of specialist backgrounds and with a broad clinical scope of practice (Reynolds & Mortimore., 2021). The civilian APs have developed a career strategy that standardises the role, which promotes role identity and growth and enables career development (Lawler et al., 2022).

It is envisaged that Advanced Practice within DMS may offer the same positive impact experienced by the NHS (HEE, 2017., Fenwick et al., 2020., HEE, 2018., Paxman et al., 2021). If AP roles were formally developed in the DMS, it could offer improved clinical capabilities on operations, mentorship and training for junior military nurses/AHPs. In addition, this level of advancement may provide experienced military nurses and AHPs with a clinically facing career, as has been found in the NHS (Nuffield., 2016), reducing the risk of senior clinicians moving into managerial non-clinical roles or leaving the Armed Forces. Furthermore, a clinical-facing career pathway for senior DMS personnel could improve recruitment and retention. Lastly, for APs working in the reservist forces, it could be considered an unexploited advanced practice resource. The reserve forces have more examples of APs who work full-time in the NHS and part-time in the military. When deployed, these reservist APs revert to being employed as a nurse or AHP, as there is no

deployed function for a reservist AP. This results in their skills and experience not being used to their full potential.

This PhD seeks to address existing gaps in our understanding to inform the development of the AP role in DMS pre-hospital care. The remainder of this chapter provides a contextual overview of the DMS and military pre-hospital emergency care (PHEC) before setting the scene on current APs working in military pre-hospital care. Lastly, it will outline my role within the military and its implications for this research.

1.2 Defence Medical Services

The Navy, Army and RAF collectively come under the DMS. The DMS has two roles; firstly, in both peacetime and deployed settings to provide healthcare for armed forces personnel. Secondly, to deploy in support of UK operations. For example, deploying to a field hospital in Iraq known as OP TELIC. The DMS workforce consists of 12,200 service personnel (8,250 regular and 3950 reserves) (DMS, 2021). Regular service personnel work full-time with the military and are posted to different assignments during peacetime and deployments. Reservist personnel undertake part-time work with the military. Aside from their military role, reservists work full-time in their civilian role, which could be in the NHS and then are called forward for deployments when needed.

Regular personnel specialising in secondary healthcare are placed within Joint Hospital Groups (JHGs), working alongside NHS colleagues. There are 5 JHGs; Royal Centre Defence Medicine (RCDM) at Queen Elizabeth Hospital, Derriford, Queen Alexandra, Frimley Park and James Cook NHS Hospital Trusts. The role of the JHGs is to enable clinicians to maintain their skills in preparation for future deployments. Nurses, paramedics and doctors work alongside their NHS colleagues in similar roles to their

deployed positions under an agreed job plan written by their military line manager. A job plan is an annual requirement that outlines clinical time balanced against military duties and developmental needs. In addition, the DMS personnel based at JHGs deliver set contracted hours for the NHS. This is often a minimum number of shifts to ensure that the NHS is not left with a deficit in the workforce when the military deploys at short notice. When not working for the NHS, personnel must maintain their deployed role by undertaking mandatory military training such as weapon handling, fitness and pre-deployment training.

Other postings for DMS personnel include single-service non-clinical assignments in staff or command, such as working as an instructor, writing policy or in a training role. When working in a non-clinical post, there is a mandatory requirement to maintain an agreed number of clinical hours in an NHS Trust to reduce skill fade. For example, RAF nurses are required to undertake 80 hours bi-annually.

The DMS assigns nurses, paramedics, and doctors to JHGs or other single-service non-clinical posts every 2 to 5 years. These postings allow individuals to showcase their skills in different areas, such as teaching or command roles. Armed Forces personnel are appraised annually by two reporting Officers. When an individual is eligible for promotion, the appraisals are presented to a board to review and consider if they are ready to be promoted to the next rank. The appraisal reviews performance and future potential. For example, Officers' appraisals are assessed against the following criteria: leadership, professional effectiveness, effective intelligence, judgement, management, reliability, initiative, powers of communication, subordinate development, courage, and values.

In their deployed role, the DMS deploys jointly, working with all three services, NATO and other military allies. Deployed care is consultant-delivered throughout, meaning a

consultant is physically present in most deployments. If not, remote access is made available. During the deployment, the DMS treats Armed Forces personnel from the point of wounding until they return to the UK. This is known as the operational patient pathway.

1.3 Military Pre-Hospital Emergency Care

This section outlines the differences between military and civilian PHEC. Military PHEC is different in terms of patient demographic, characteristics and injury mechanisms. In addition, the chapter will present an overview of how the military deploy PHEC overseas. It will explain the differences in military versus civilian patient pathways. Finally, will detail the skills and roles of the deployed PHEC workforce.

Patient characteristics and injury mechanisms

Military (Army, Navy and RAF) pre-hospital care differs from the civilian model in terms of injury pattern, population and morbidity (Reed and Bourn, 2018). Military patients are generally fit and healthy. For example, during operations in Iraq (Operation TELIC), there were 179 UK Forces deaths: 135 from hostile causes and 43 from other mechanisms. Afghanistan (Operation HERRICK) resulted in 456 deaths (405/51). From further analysis of the data during Operation HERRICK 1, in the period Apr 2006 – 30 Nov 2014, the UK field hospital admitted 7800 patients, of which 7601 were UK Armed Forces personnel. Of the 7601 UK patients, 4220 were admitted for traumatic injuries. Of the 4220 traumatic admissions, half were battle injury (BI), and the other half were disease non-battle injury causes such as climatic or diarrhoea illnesses (DNBI) (Bricknell and Nadin, 2017). A further 275 patients from the BI group sustained amputations. The initial clinical presentation is that of hypovolemia. This patient demographic and profile contrast sharply

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with the UK civilian population, where the most frequent service users are people aged

over 80 years amongst whom the most frequent conditions needing treatment include

musculoskeletal, soft tissue injury and gastrointestinal causes (Commons, 2017).

Operational Patient Pathway

Military pre-hospital care is delivered in austere and often combative locations, presenting

challenges in its delivery (Reed and Bourn, 2018). Unlike civilian healthcare, military

healthcare delivery is deliberately planned for exercises and operations with UK military

policy tactically placing medical assets tailored to different deployments (Hodgetts and

Mahoney, 2009). Varying levels of treatment facilities and pre-hospital providers within the

battlespace ensure patients can reach care promptly. This is known as the Operational

Patient Pathway outlined in figure 1.1 (Bricknell, 2014).

Fig 1.1 Operational Patient Pathway
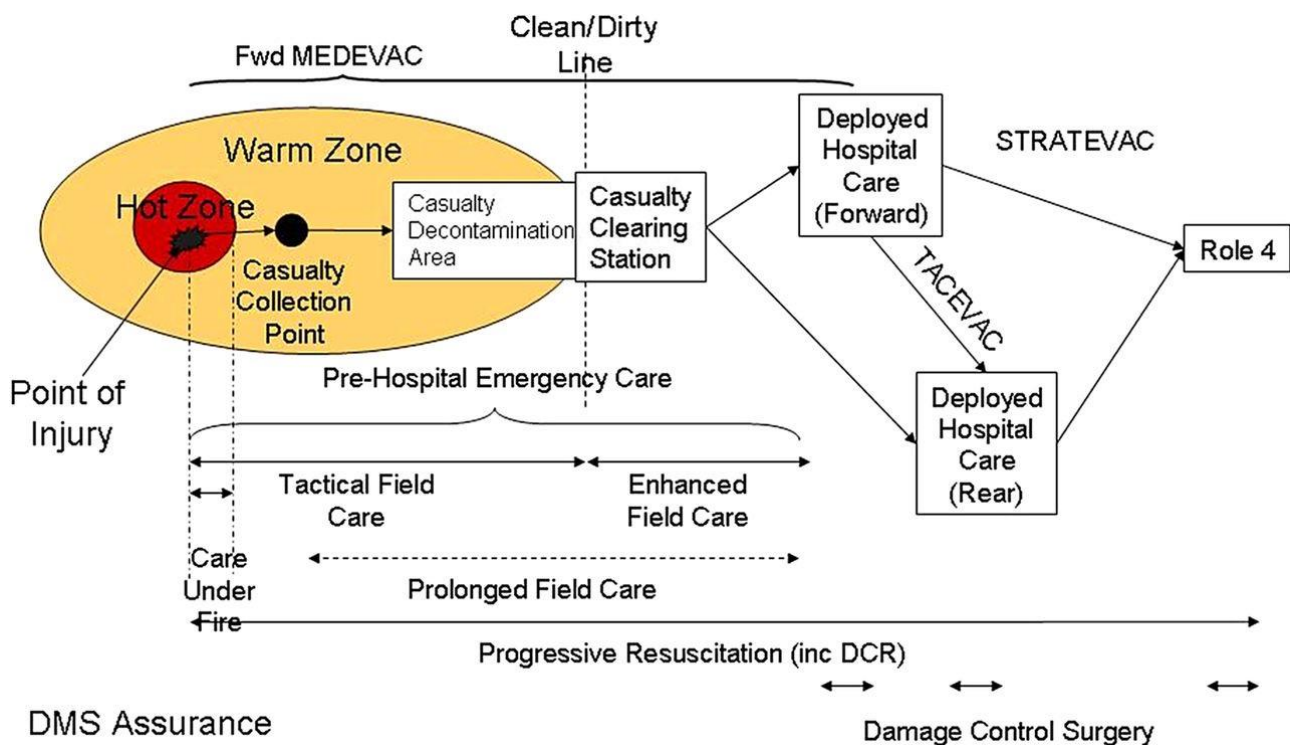
Figure 1.1 describes the progressive level of care given to military patients from the point of wounding towards definitive care within a Role 4 treatment facility. Patients receive higher levels of care as they move through the pathway.

Joint doctrine for the Army, Navy and RAF medical support on deployments states patients must receive 'lifesaving procedures within 10 minutes, advanced resuscitation and pre-hospital care within 1 hour, life, limb, function preserving and resuscitation 2 hours from injury or wounding' (CONEMP, 2015). This doctrine sets the standard to assist with planning during deployments on where to place medical assets to meet the NATO timeline. Unlike the civilian model, military patients routinely receive lifesaving treatment within 10 minutes of injury by trained first aiders (Hodgetts and Mahoney, 2009). This rapid delivery of care is provided by non-medically trained soldiers who receive combat-specific first aid training. Other military personnel receive additional training and are known as 'team medics'. These team medics can deliver an enhanced range of additional lifesaving procedures at the point of injury. If patients cannot be treated whilst deployed, they are recovered to Royal Centre Defence Medicine at Queen Elizabeth Hospital, considered a Role 4 treatment facility. The UK delivers the above care planned in deployments through the operational patient pathway to achieve the timings set out in joint doctrine. In contrast to the civilian system, medical care is not requested by a 999 call. It is called for via a pre-set request containing 9 lines of information to the operations room. The report is known as a "9-liner" and includes details relating to the scene, patient type and ground threat. The 9-liner request is processed by the patient evacuation coordination cell (PECC). PECC then decides and tasks the most appropriate pre-hospital asset to meet the patient's needs. The approach aims to put the most suitable level of PHEC provider and equipment at the right place.

PHEC Workforce

Defence PHEC is categorised in military policy across eight levels of capability. The

PHEC levels reflect job titles and qualifications (figure 1.2). The levels aim to balance the

clinical need against the level of clinical skill required.

Figure 1.2 Defence PHEC Levels of capability taken from Joint Pre-Hospital Care

Concept of Employment (2015)

Specialist PHEC "PHEM"	Level 8[1]	Consultant with regular PHEM practice, FIMC and MERT Cse pass
	Level 7	Registrar, post-national PHEM training, with regular PHEM practice, FIMC and MERT Cse pass
Vocational Provider "Cap-Badged Medic"	Level 6[2]	MO or advanced PHEC practitioner (PHEC nurse or paramedic) with appropriate PHEC training, current PHEC practice, up to date L6 skills and competencies, DipIMC and MERT Cse pass
	Level 5[3]	MO with BATLS/MPHEC. PHEC nurse or paramedic with current PHEC practice, up to date L5 skills and competencies and BATLS/MPHEC
	Level 4	Defence Medic/MA/CMT1/RAF Medic with up to date skills workbook and BATLS
Non-Vocational Provider	Level 3	Patrol Medics, Advanced Team Medics
	Level 2	Team Medics, Remote Team Medics
	Level 1	All Service Personnel - annual sS mandatory training

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

The PHEC levels were designed from the NHS skills for health framework, which uses

broad definitions to outline career pathways across various roles. The NHS skills for

health framework ranges from initial entry jobs to Clinical Director (Skillsforhealth.org.uk,

2016). The civilian equivalent to the Defence PHEC levels is the Faculty of Pre-Hospital Care (FPHC) levels. The FPHC also based their eight levels of pre-hospital providers using the NHS skills for health framework. The FPHC is a professional body for UK pre-hospital care which promotes governance through its training standards. Its mission statement states that "The Faculty aims to promote high standards of pre-hospital care through education, research and teaching" FPHC (2017). This organisation has developed PHEC competencies alongside its curriculum to provide guidance on PHEC education, training and scope of practice for pre-hospital practitioners. The FPHC levels range from the first aider to advanced registered pre-hospital provider, see table 1.1.

Table 1.1 FPHC PHEC Skills Framework

Faculty of pre-hospital care levels	Levels Descriptors
A	First Aider (management of an unconscious, bleeding or arrested patient). Certificated by a non national organisation.
B	First Level responder, nationally certified and qualified to meet statutory requirements within the work place eg EFAW, FAW.
	Levels C to H will be operating within a framework of governance and CPD
C	Nationally certificated pre-hospital responder (use of airway adjuncts & oxygen) eg Community First Responder
D	Nationally certificated non healthcare professional pre-hospital provider caring for patients as a secondary role eg Police Officers in Specialist Roles, Fire Service IEC, equivalent UKSAR trained personnel, Enhanced Community First Responder
E	Nationally certificated non healthcare professional pre-hospital provider caring for patients as a primary role eg UKSAR, some military personnel and specialist certificated police officers and firefighters.
F	Non-registered health care professional eg Ambulance Technician, CMT1.
G	Registered pre hospital care practitioner
H	Advanced registered pre hospital care practitioner

Like the FPHC, the military is based on eight levels of pre-hospital care (seen in figure 1.2), starting with a basic first aider/medic progressing to a consultant who has sub-specialised in PHEM; however, these are outlined numerically. The FPHC levels are mapped over to specific pre-hospital skills that enable a doctor, nurse, or paramedic to be recognised at any level. The military PHEC levels are not defined by skills but instead, they are mapped to roles and training; for example, levels 7-8 are physicians only, and level 5 is a medical Officer or paramedic or nurse. In contrast, the FPHC in 2019 accredited a nurse as a level 8 pre-hospital advanced provider based on skills, not job roles. The implications of the military PHEC levels, which are based on roles, not skills, exclude nurses and paramedics from developing past level 5 and, in theory, level 6. This is because level 6 is not formally defined, and level 7/8 is for doctors only who have sub-specialised in PHEM.

The military PHEC levels of care deploy different teams of varying levels and are scaled up and down depending on the pre-hospital cover required. In parallel to this system, different levels of military treatment facilities are placed geographically, as outlined in the operational care pathway. Medical Emergency Response Teams (MERT) may be called upon to provide pre-hospital care and rapid evacuation. MERT comes under a NATO definition of Medevac. Medevac is the collective term used by different militaries to describe the medical evacuation of casualties using a designated vehicle or airframe with a trained medical team. 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. Over the last ten years, MERTs have been primarily deployed in Afghanistan, Iraq and Kenya. 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 (PHEM level 8), a Specialist Emergency Medicine Nurse (PHEC level 5) and two Paramedics (PHEC level 5). This configuration is known as a MERT and was formally defined as a MERT Enhanced Team (Thompson et al., 2022). With a level 8 consultant physically present, it can offer the highest level of critical care to the most severely injured or unwell patients. Over the last ten years, MERTs have continued to develop the provision of world-leading pre-hospital care, resulting in improved survival rates for the most severely injured patients (Morrison et al., 2013, Calderbank et al., 2011, Reed and Bourn, 2018). Morrison et al. (2013) compared MERT enhanced against other non-UK non-physician led medevacs deployed in Afghanistan between 2008-2012. The study demonstrated improved survivability and quicker transit time to the operating room for MERT Enhanced patients who were classified as moderately injured (ISS 16-50), statistically scored using the injury severity scoring system ISS (Morrison et al., 2013). This model of pre-hospital care has some direct comparisons with civilian practice. Civilian Helicopter Emergency Medicine services (HEMs) introduced the concept of critical care teams in pre-hospital care. HEMs teams typically consist of critical care paramedics and/or consultants who have sub-specialised in PHEM. HEMs are tasked to the most severely injured or ill patients (Sharpe et al., 2018).

When both MERT-enhanced and HEMs are compared, one of their main differences is the work patterns. Civilian teams work routinely in small team rotations with the same personnel. In contrast, military pre-hospital teams deploy overseas in team formation specifically generated using the PHEC levels for an individual deployment, such as for a MERT Enhanced team consisting of one level 8 and three level 5 team members. The team will typically deploy for a 4-6-month period. Due to the complexity of short-notice taskings, training and nominating individuals for deployments, the military-formed team

may only come together during pre-deployment training or for the 1st time during their

deployment. Nonetheless, despite the challenges of "just in time" training and last-minute

team composition, MERT Enhanced has provided a proven model of care in terms of

patient outcomes and impacts on mortality, that has met the military's operational needs

for Afghanistan and previous operations (Reed and Bourn, 2018).

1.4 Military APs in Pre-Hospital Care: Current context and drivers for change

Drawing on the civilian model of advanced practice, in 2010, the UK military instigated

training of APs for clinical development. At present, there are only a small number of APs

in the UK military, under 30 in total, across all three services. Some of these have been

motivated to become APs for personal development reasons rather than the need for

military support. A proportion are reservist personnel who are otherwise APs that work in

the NHS. To date, Navy and Army APs are Officers only, although there are some legacy-

trained non-Officer APs. In the RAF, APs can be either non-commissioned (non-Officers)

or commissioned Officers. A few Army nurses have completed formal advanced training

to perform the role of Military Nurse Practitioners (MNP). However, the development of AP

roles across the services has stagnated. Previous research in civilian settings suggests

that the stagnation of APs can be linked to several factors. First, professional resistance

and apprehensions of potential overlap in scopes of practices result in other professions

being concerned that their own jobs are being devalued. The AP role interlinks with

multiple professions. Within the military these consist of medical Officers, paramedics and

nurses. When roles cross boundaries it results in challenges with role identity

(Mantzoukas and Watkinson, 2007, Casey, et al, 2019). This area is discussed further in chapter 2.

Secondly, the increased autonomy the AP holds invariably has a requirement to take on additional risk and clinical responsibility. As such there is a reduced level clarity on an AP's legal liability if malpractice was to occur. Without a clear role definition, it becomes unclear who holds overall responsibility (Egerod et al, 2021., Mantzoukas and Watkinson., 2007., Jones., 2005, Niezen and Mathijssen, 2014., Currie and Crouch, 2008).

Medical Officers, specifically military GPs, predominantly provide military pre-hospital care above the skill level of a nurse/paramedic. To prepare military GPs for this role, they undertake a range of mandatory military courses in pre-hospital care, including Battlefield Advanced Trauma Life Support (BATLS) and military pre-hospital emergency care (MPHEC). Military nurses and paramedics also undertake these courses before moving onto the Medical Emergency Response Team (MERT) course. Military GPs are not eligible to take the MERT course due to their specialist background in primary healthcare and therefore cannot deploy in a MERT capacity. GPs cannot access the MERT course and pre-hospital exposure because the GP training curriculum does not cover pre-hospital care, and they cannot sub-specialise in PHEM. The General Medical Council (GMC) considers GP training schemes to have a degree of 'variability', which is deemed unsuitable in preparing GPs adequately for this sub-speciality (White, 2017). Despite this, military GPs provide a vital role in pre-hospital care for exercises and units placed overseas, for example, airfield crash cover on a flying station. However, the demand for exercise cover exceeds the availability of trained PHEC GPs. Leading to a gap within the medical workforce. A potential solution could be for an AP to meet this gap in capability.

In addition, APs from a PHEC background bring a wealth of pre-hospital experience to the level 6 role.

Today, the military is required to focus on 'contingency' operations, which means providing appropriate resources that will meet the needs of any conflict or humanitarian operation worldwide (Ingram and Mahan, 2014). Planning for future contingency operations suggest that the DMS are likely to operate using a smaller medical footprint (equipment and personnel) spread over more significant geographical locations, requiring the DMS to do more with less. This development may present a logistical challenge in ensuring that patients can promptly access the necessary medical care. Pre-hospital capabilities may need to adapt and utilise different modes of transport, e.g., smaller airframes or maritime platforms to extract patients, different levels of care and skill mix (physician or nurse/paramedic led). Further compounding the above operational challenges are the predicated shortages in the medical workforce, which link to gaps in PHEC capability from the military GP workforces. In addition, figures for military recruitment of Medical Officers demonstrate that annual targets have been continually missed, resulting in a 'cumulative impact' of military doctor shortages. AFPRB (2019) reports a 22% deficit of Medical Officers in 2018. Furthermore, there continues to be an ongoing increase in voluntary resignations, with 41% of Medical Officers intending to leave the Armed Forces in the next six years (AFPRB, 2019).

Given the shortage of Medical Officers, the lack of capacity to develop GPs in a specialist PHEC role and ongoing demand for up-skilled military pre-hospital care, there is a strong case for utilising APs to complement the multi-disciplinary workforce. APs may be able to address a number of operational challenges faced by DMS in relation to the availability

and skills levels of doctors, and also the need to rationalise resources. APs could be employed as the clinical lead on a MERT Standard or medevac asset (doctor not present) in a PHEC level 6 capacity. The APs might also deploy within MERT Enhanced, replacing a level 5, upskilling the team to deliver critical care interventions or managing several higher acuity patients alongside a doctor. This would bridge the gap between level 5 and Medical Officer delivered care, offering flexibility within the workforce for deployments. APs could provide timely access to skilled care along the operational patient pathway.

Traditionally the DMS provides a consultant-delivered service for most of its deployed healthcare. Whilst it is not suggested that APs should replace doctors, the AP role does offer some degree of resilience for solo deployed consultants or consultants covering multiple areas for future operations. This is replicated within the NHS where experienced APs that meet the required skill set are the clinical lead for resuscitation or during traumas. It could be the case that an AP deployed alongside a consultant has the potential to reduce the '24 hour' on-call burden, a requirement for some capabilities, which would further negate the need to deploy a second or third consultant. Furthermore, the AP role may provide military nurses and paramedics with a clinical academic pathway, retaining clinical expertise in military service (Paxman et al., 2021).

1.5 Future military context and needs for AP in the military.

The Future Operating Environment 2035 paper (UK MOD JFC Development, 2014) states that the outlook to 2035 will be 'challenging', with underpinning themes including 'growth in population, migration, energy demand, climate change, globalisation and urbanisation. These issues will impact healthcare, presenting as unforeseen threats or shocks. Defence

Healthcare must be adaptable and ready to deal with these ongoing threats, which could manifest themselves in humanitarian crises or conflict (CONEMP, 2015). The Strategic Defence & Security Review (SDSR) (2015) indicates that overseas threats to national security will increase in terms of complexity, number and scale (Fallon, 2016). The review has identified and aligned funding to develop and maintain a range of capabilities to address these threats, however, there will be an increase of only 300 people to manage these new capabilities. Under Permanent Joint HQ, three field hospitals are the stated requirement (Fallon, 2016). Defence will need to review its output and make adjustments to rebalance internally and externally to meet and maintain operational output.

Following previous conflicts in Afghanistan and Iraq, analysis from commanders identified 'themes' to be explored and taken forward for future operations. These included a review of Defence focusing on recruitment, workforce, capabilities and exploring future collaborative working with allied nations. As discussed earlier, future military healthcare deployed on operations is likely to be challenging. The injury spectrum, location of medical assets, climate, and patient demographics, including civilians, prisoners and paediatrics, present a broad set of issues. In addition, due to the vast spread of medical assets which are tactically placed, this geographic challenge is likely to result in patients being held in location for longer until medical assets are available to evacuate (Bricknell and Nadin, 2017). The extended timelines mean that military personnel will need to care for patients for longer in austere settings and close to the battle location; this is known as prolonged field care. Prolonged field care is a new requirement in combat operations and differs from the previous status quo of healthcare delivery seen in Iraq and Afghanistan. A study conducted by Special Forces reviewed 54 prolonged field care patients held in location for between 4 – 120 hours, median time 10 hours. These patients were cared for

in an austere combat treatment unit and experienced evacuation delays for several

reasons. Inclusive of asset availability, enemy action preventing extraction of the casualty

or unforeseen weather conditions. Special Forces Medical Sergeants managed at least

70% of patients; five patients (9.3%) died of wounds before evacuation (DeSoucy et al.,

2017). The research strongly recommended that prolonged field care patients require

personnel to be trained to an 'advanced level' to manage and bridge the gap in capability

to provide care.

In the UK, some of the above operational challenges in military healthcare are being met

with a review of the DMS workforce, with consideration for up-skilling personnel to plug

predicted capability gaps, as articulated in the DMS' Strike Policy' (Owen, 2017). The

DMS has restructured under plans from the Surgeon General following the SDSR review.

DMS 20 which outlined that medical capabilities needed to meet the demands of the 21st

century. Plans outlined in DMS 20 rebalanced the workforce, resulting in an overall

reduction of DMS personnel by 17% between 2013 and completed by 2020. This

reduction of regular personnel saw an uplift in the recruitment of reservists. DMS 20

ultimately aimed to achieve 'the right mix of uniformed and non-uniformed healthcare

providers' to deliver Defence healthcare (AFPRB, 2019). With future demands of conflicts,

these will likely be met by using a mixture of full-time and reservist personnel; a cohort

concept referred to as the 'Whole Force'. The whole force already contains APs trained

from the NHS working with the reserves; however, to optimise the output of this force, the

utilisation of APs deployed role should be explored.

An additional theme noted within the DMS' Strike Policy' is the requirement for continued

joint working with NATO, reservists, and the NHS to ensure the workforce is ready for

future deployments. An expert opinion paper outlining the 'Future Character of Military

Medicine'; highlights collaborative working as a critical force enabler (Hodgetts, 2012). The article recognises the need for understanding different scopes of practice and draws upon the experience of working with US and Danish Nurse Anaesthetists, noting the benefits of these extended roles compared to the UK Anaesthetic nurse. The paper comments that an understanding of these new roles combined with appropriate guidance could help to ensure they are deployed to their full potential (Hodgetts, 2012). A US paper reviewing future conflicts presents a shift in warfare noted from analysis of the previous two large-scale operations in Afghanistan and Iraq, requiring commanders to be flexible and dynamic in their approach. Deploying capabilities need to be mobile and respond quickly to the evolving nature of future threats. The paper comments on the requirement to up-skill nurses to Advanced Nurse Practitioners (ANP) to enable deployment to remote areas facilitating rapid access to healthcare (D'Angelo et al., 2019).

1.6 Significance of the research

With positive research indicating the efficacy of APs in non-military settings (Swaby et al., 2022 & Egerod et al., 2021) but with limited international evidence to support their use in the military environment (Paxman et al., 2021), the UK DMS are seeking to explore the role further. This thesis aims to understand the potential role of APs in the delivery of future operational healthcare.

As alluded to, the UK military has instigated training APs; however, their operational utility is yet to be defined. Without identifying defined deployed roles, military AP development will remain stagnated and may result in the misemployment of current trained APs, role ambiguity and APs trained by the military leaving the service. Role ambiguity and

misemployment of APs was experienced during the introduction of APs in the NHS and international militaries (Jones, 2005, Mantzoukas and Watkinson, 2007, Lewis et al., 2012, Blaz et al., 2013). In terms of drivers for AP development in civilian settings - notably patient need, demographics and medical workforce gaps (Bryant-Lukosius et al., 2004) - these drivers are now starting to manifest themselves within Defence. Future conflicts, such as prolonged field care may result in a range of challenges that may restrict access to timely medical care along the OPCP. Changes in patient demographics from humanitarian operations result in a full spectrum of patients with varying complex health needs. The DMS's future workforce requires new thinking and training to meet the requirements set out in DMS 20 (AFPRB, 2019). An up-skilled workforce trained in advanced practice could go on to meet some of the future operational challenges and capability gaps in military pre-hospital care. Following the evolution of civilian AP roles and positive reports surrounding advanced practice, this area needs further research to address the current knowledge gap and explore if the military AP role has utility for operations. This thesis will address the research need.

The research questions for this research are:

RQ 1. What clinical and non-clinical skills are required for the performance of L6 pre-hospital emergency care in military settings?

RQ 2. What work activities do military APs currently perform in practice?

RQ 3. What are military pre-hospital personnel's' perceptions and experiences of the AP role as it currently operates, and what are their views on its future value in military settings?

1.7 My background as a Royal Air Force Nursing Officer

As a serving Royal Air Force Nursing Officer, I was inspired to undertake my Masters in Advanced Practice whilst working as a military nurse in a NHS Level 1 Trauma Centre. Whilst working alongside APs, I was hugely impressed with their role and how it integrated into the emergency department workforce, offering patients a range of additional capabilities to access assessment and treatments promptly. This doctoral work builds on my MSc. dissertation, which focused on military Advanced Clinical Practitioners (ACP) who were credentialed by the Royal College of Emergency Medicine (RCEM) (Paxman 2014). My retrospective MSc study of data from the Afghanistan conflict analysed the treatment and outcomes of UK patients transported by a MERT helicopter, focusing on trauma patients grouped and scored using the injury severity score (ISS) 16-24. The study considered whether an RCEM ACP could deliver the same clinical interventions to that of a Medical Officer for patients in the 'moderately injured' category in a military operational pre-hospital environment. Out of 177 patients with ISS scores of 16-24, 81.9% (n=145) of the interventions given on MERT were within the RCEM ACP's competencies. The principal intervention beyond the current scope of an RCEM ACP was Pre-Hospital Emergency Anaesthesia (PHEA) and endotracheal intubation. These interventions were required in 18% of the patients (n=32) and are considered level 7-8 skills, usually performed by a sub-specialised pre-hospital registrar or consultant. Despite limitations of the study which included a small sample size and a focus on trauma patients, it offered important findings relating to the capabilities of an AP within the pre-hospital setting. These results started to demonstrate the potential of extended 'scopes of practice' a military AP would offer when deployed within pre-hospital settings.

I currently work as a military Advanced Clinical Practitioner in both the NHS emergency and pre-hospital environments. In addition, I am the Specialist Nurse Advisor for Advanced Practice in the RAF. My clinical role and military rank within the Armed Forces will frame and influence the research (Malterud, 2001 & Seale and Silverman, 1997). As such, it is important to acknowledge my epistemological position in this thesis, which is discussed further in Chapter 4.

1.8 Layout of thesis

This thesis comprises ten chapters. Chapter 1 has presented the background to the study, including an overview of the DMS, focusing specifically on military PHEC in the context of the operational patient care pathway and introducing the importance and the rationale for undertaking the research. Chapter 2 provides the clinical role context, outlining AP roles in both military and civilian environments and reviewing the drivers, development and evolution of APs. Chapter 3 presents the findings from the literature review, exploring the skills and practices of APs in PHEC settings. Chapter 4 describes the methodology for the study, with Chapter 5 explaining the methods and conduct. Chapter 6 presents the results of a Delphi method, designed to investigate clinical and non-clinical skills for level 6 PHEC (Research Question 1). Chapter 7 presents the findings from the qualitative study that used semi-structured interviews to explore the current work of military APs, and the views of military PHEC personnel on their perceptions and experiences of APs (questions 2 and 3). Chapter 8 draws together the findings from the two study components in relation to research questions and provides a discussion. Chapter 9 outlines recommendations for military AP. Lastly, Chapter 10 concludes the thesis.

1.9 Conclusion

Based on previous research and my clinical experience, it has become evident that the role of APs could offer advantages for the DMS. There are potential advantages for the employment of APs in delivering deployed healthcare, more specifically in the context of pre-hospital care. This chapter has highlighted the potential advantages of introducing APs to military PHEC. If APs were employed in the DMS, it may promote clinicians to remain in clinical roles and provide an alternative role between a doctor and nursing/paramedic professionals for deployments. APs may potentially enhance retention rates but also optimise the utilisation of reservist APs, thereby fostering a more cohesive and effective healthcare team for deployments.

Although there is some existing literature, there remains a lack of research on UK military APs, particularly regarding their involvement in deployed PHEC. Military APs are still a relatively new concept, and their specific role in supporting future operations, including their deployment for operations and employment more generally within the UK Armed Forces, has not been clearly defined yet.

To address this gap, this PhD study aims to identify and understand the required clinical and non-clinical skills necessary for military Level 6 PHEC practice. Further, it explores the responsibilities that military APs undertake in their current roles. Lastly, it investigates the perceptions and expectations of military pre-hospital personnel concerning the current role of a military AP and their views on the future significance within the PHEC workforce. The next chapter will provide an overview of the current understanding of APs both in civilian healthcare settings and within the military, offering a contextual background for this study.

Chapter 2: Advanced Practice in civilian and military settings

2.1 Introduction

This chapter presents the background and context of AP roles in both civilian and military environments. While the contextual overview is primarily based on civilian experiences, it highlights significant differences in the evolution of AP roles between the two sectors. Compared to the military, civilian AP roles have evolved significantly in various areas. Internationally civilian APs work independently in emergency departments, urgent care, secondary and primary healthcare. Despite this growth in the role, there have been many challenges in its introduction and onward development within the Defence Medical Services (DMS). Civilian AP roles have some degree of overlap with military healthcare and have considerations that can be drawn upon when compared to military practice. Understanding the civilian drivers provides insights and lessons applicable to military PHEC.

This chapter first describes the civilian drivers for developing the role. It then outlines the impact on AP roles in healthcare before focusing specifically on civilian APs in the pre-hospital care environment. Understanding the scope of practice and competencies of civilian pre-hospital APs provides a basis for comparison with potential military APs in a similar context. In the final sections, an exploration of the limited literature regarding AP roles within the Armed Forces, from both the UK and international military settings, enabled valuable insights to be drawn on the current state of military healthcare workforces that are utilising APs in deployed settings. This exploration offers a contextual understanding of how AP roles are being employed in various military specialities.

2.2 Defining Advanced Practice

Advanced Practice (AP) is an international phenomenon (Savrin, 2009) developed in the

nursing profession. The first AP roles emerged in the US in around the 1960s, originating

from primary healthcare, before becoming commonplace in Canada, New Zealand,

Australia, and finally Europe (Duffield et al., 2009). Advanced Practice, despite originating

from the nursing profession, has now been developed with other professional groups,

including paramedics, pharmacists and physiotherapists. An Advanced Clinical

Practitioner is defined by Health Education England as;

> *"Advanced clinical practitioners come from a range of professional backgrounds such*
>
> *as nursing, pharmacy, paramedics and occupational therapy. They are healthcare*
>
> *professionals educated to master's level in and have developed the skills and*
>
> *knowledge to allow them to take on expanded roles and scope of practice caring for*
>
> *patients"* (HEE, 2017).

The National Health Service describe advanced clinical practice as:

> *"Delivered by experienced, registered health and care practitioners. It is a level of*
>
> *practice characterised by a high degree of autonomy and complex decision making.*
>
> *This is underpinned by a master's level award or equivalent that encompasses the*
>
> *four pillars of clinical practice, leadership and management, education and research,*
>
> *with demonstration of core capabilities and area specific clinical competence.*
>
> *Advanced clinical practice embodies the ability to manage clinical care in partnership*
>
> *with individuals, families and carers. It includes the analysis and synthesis of complex*
>
> *problems across a range of settings, enabling innovative solutions to enhance*
>
> *people's experience and improve outcomes"* (NHS, 2017).

There are similarities between the NHS and HEE definitions in the way that APs work autonomously to manage patients, plan care and handle associated complexity. They are deployed in a variety of clinical settings, working as advanced clinical leads for patients and hold a master's qualification in Advanced Practice.

2.3 Drivers for UK Advanced Practice

Multiple drivers have resulted in the introduction of APs in the delivery of civilian healthcare in the UK (HEE, 2018). The most commonly cited is that the role offers a solution to manage workforce shortages. A commissioned NHS report published by The Nuffield Trust (2016) outlines new roles to reshape the workforce, including the AP role. It identified several drivers to enhance patient care using expanded roles. Aside from filling medical workforce gaps, further benefits were noted from deploying APs in the NHS, including mentorship for junior staff and developing nurses professionally and technically to meet increasing patient demands (Reynolds & Mortimore, 2021).

Lastly, the report indicated that APs were seen as a positive retention initiative for senior nurses, as the role enabled experienced nurses to remain patient-focused. Thus, it negated the need for senior nurses to move into managerial positions to progress further in their careers. Keeping senior nurses clinically facing by developing as an AP retains value and experience alongside a clinical career pathway, up to consultant nurse.

The Nuffield report concluded that the development of personnel from a non-medical background offers new, efficient, and effective ways of working (Nuffield, 2016).

Medical shortages within the National Health Service (NHS) have directly impacted the ability to provide healthcare for a population with increased mortality and associated chronic health needs (RCEM, 2015). Furthermore, an ongoing decrease in medical recruitment in the NHS and the introduction of the European Working Times Directive resulted in significant gaps across the medical workforce. Specifically, in emergency medicine, these issues were further compounded in regard to patient demand for emergency care resulting in increased access with fewer doctors to provide care (Cooper and Grant, 2009, Woo et al., 2017, HEE, 2018). In addition, the nature of emergency work, combined with anti-social hours, an overstretched workforce, and patient demand, heavily impacted the recruitment and retention of doctors in emergency departments (BMA, 2016, RCEM, 2015). According to the Royal College of Emergency Medicine (RCEM), there remains a significant concern regarding the sustainability of the medical workforce in Emergency Departments (ED). RCEM estimates a "2000-2500 shortfall" of full-time EM consultants; of the remaining number, half reported that they are likely to reduce their hours. Due to pressures in ED, some are reconsidering other employment, 22% may retire early, and a quarter reported considering a career break (RCEM, 2021, Beedle, 2023).

The NHS workforce challenge has been met with a change in strategy for healthcare delivery such that professionals from non-medical backgrounds, including nurses, paramedics and pharmacists, are increasingly trained in autonomous practice undertaking roles known as Advanced Clinical Practitioners (ACP). This novel way of working has changed the perceived traditional healthcare delivery model (Woo et al., 2017, RCEM 2023) from being doctor-led to a shared delivery model to close workforce gaps and

promote sustainment of healthcare delivery (King et al., 2017 & Woo et al., 2017). By way of example, the ACP and other advancing roles, such as the Emergency Care Practitioner and Advanced Paramedic Practitioner, have been introduced (HEE, 2018). Of note, the ACP role is the first standardised role that is credentialed by the RCEM (RCEM, 2018). UK Emergency Medicine was considered an early adopter of using APs to fill workforce gaps and to meet the 4-hour time target for patient presentations (Currie and Crouch, 2008, Dean, 2017).

ACPs were identified as part of a solution to meet the demands of increasing patient needs and to provide a sustainable multi-disciplinary workforce (Currie and Crouch, 2008, HEE, 2018, Reynolds & Mortimore, 2021). This view was supported by the Nuffield report, which considered the development of APs such as ACPs as a way of 'sharing the burden' of patent complexity and providing a workforce from a mix of skilled clinicians (Nuffield, 2016). Large patient numbers and workforce pressure have resulted in the need to up-skill the pre-hospital workforce (HEE, 2018). Health Education England's report entitled 'Facing the facts, shaping the future', outlines that since 2012, the population has increased by 4%. This increase relates to people living longer with associated chronic conditions, which puts significant demands on the NHS workforce (HEE, 2018).

2.4 Civilian UK Pre-Hospital Advanced Roles

The same drivers for APs in emergency care are replicated in the pre-hospital environment. To meet these challenges, the College of Paramedics has published a framework that outlines a range of advanced practitioner roles, including i) Specialist Paramedic, ii) Advanced Paramedic, and iii) Consultant Paramedic (Framework, 2014).

Advancement in paramedic practice was first introduced to respond to rising emergency calls, specifically for urgent care in around 2005. This increase in demand has outstripped primary care delivery services, requiring a change in workforce strategy (Jashapar, 2011). As a result, paramedics were up-skilled to provide specialist out-of-hours urgent care access (von Vopelius-Feldt and Benger, 2014). Roles such as Emergency Care Practitioners and Specialist Paramedics enable a team outside of the traditional medical model to provide pre-hospital advanced assessment, diagnosis and timely access to prescribed medication to reduce pressure on both primary and secondary health services. This increase in the volume and demand of urgent care patients has diluted the exposure for pre-hospital APs in critical care patients and has resulted in two pre-hospital AP sub-specialities: one in urgent care and one in critical care (von Vopelius-Feldt and Benger, 2013).

Further specialisation of other paramedics and a minority of nurses has taken place in specialist pre-hospital critical care. Their development was in response to recommendations set out in the following national reports: Major Trauma Care England and Trauma Who Cares (NCEPOD, 2007, Office, 2010). Roles trained in this area are referred to as; Critical Care Practitioner/paramedic (CCP), Advanced Paramedic Practitioner (APP), and Specialist Practitioner (critical care) (SP-CC).

All of the above are trained specifically in critical care and can deliver a range of 'advanced' skills, depending on the local ambulance Trusts where they work. These skills include a) surgical airways, b) thoracostomies, c) ketamine sedation, d) advanced drug delivery (magnesium, inotropes, intranasal analgesia), e) the ability to act as a suitably qualified assistant in the delivery of pre-hospital emergency anaesthesia (PHEA) and

advanced decision-making. In some pre-hospital services, advanced practitioners can extend their skill set to include the use of paralytic agents in conjunction with sedation to maintain anaesthesia in patients intubated during cardiac arrest and the use of ultrasound and delivery of blood products when a doctor is not present (von Vopelius-Feldt and Benger, 2013). These pre-hospital roles and scopes of practices differ and are dependent on local standard operating procedures (SOP) and academic training. However, the literature suggests that APs trained in critical care are associated with decreased patient mortality through enhanced clinical decision making, clinical leadership, access to additional lifesaving medications and are trained in life saving procedures (Hughes, 2011, Jashapar, 2011).

2.5 International Pre-Hospital Advanced Roles

Comparatively, APs in some countries have evolved further than the UK in terms of autonomy, formal regulation and scope of practice. In the US and Canada, the establishment of Advanced Paramedics is reported to have led to a 20% lower mortality for patients compared to the UK traditional paramedic model that is not trained in AP (Jashapar, 2011). In some countries, including New Zealand, Australia, and South Africa, paramedics and nurses provide autonomously delivered pre-hospital critical care with an even broader scope of practice, including advanced airway management with intubation and delivery of pre-hospital emergency anaesthesia (PHEA), a procedure that in the UK is only delivered by a pre-hospital physician. In Australia, the Mobile Intensive Care Ambulance (MICA) paramedics have a range of extended critical care skills, including PHEA. MICA paramedics are predominately dispatched to major trauma following an

intensive training program; this role is associated with successful outcomes in respect to MICA-trained paramedics delivered PHEA (von Vopelius-Feldt et al., 2013).

2.6 Challenges for Advanced Practice

Despite the substantial growth of APs internationally and in the UK, establishing the role has not been without significant challenges. Whilst a complete review of the literature, specifically on the challenges experienced by APs in different civilian settings, is not the primary focus for this PhD, there are some important implications for consideration for this research. Therefore, this next section will alert the reader to some of the more established findings from that literature.

Role conflict

A shared and problematic issue originating from a blurring of roles between professions has caused an ongoing struggle for APs (Mantzoukas and Watkinson, 2007, Jones, 2005, Niezen and Mathijssen, 2014, Currie and Crouch, 2008). Meta-synthesis reveals that the extensiveness of this issue is well documented in the literature (Jones, 2005). Jones (2005) found that role conflict from a blurring of professional groups is one of the main barriers to AP development. Some nurses felt that expanded practice took them away from basic nursing care and shaped them towards undertaking medical tasks, like "mini doctors" or "wannabe doctors" (Lawler, et al., 2022). In a mixed methods study by Lawler et al., (2022), a participant described a "mini doctor" label, which is associated with role conflict between doctors and nurses, "of being called 'Noctors". This quote illustrates the challenge of advancing as an ACP due to the perception from nurses and doctors of

"acting as doctors but not doctors". In the interviews conducted by Lawler et al. (2022), ACPs expressed a sense of being constantly evaluated and "ranked" against doctors. The development of advanced practice seems to evolve against a background of ingrained hierarchical structures.

Conversely, in an earlier study by Currie, et al. (2008) study, one nurse described the role as a positive initiative that expanded nurses' scope of practice and made good use of their skills and experience (Currie and Crouch, 2008). Doctors' opinions on AP roles were influenced by their "education and job security" (Niezen and Mathijssen, 2014). Currie, et al. (2008) found that doctors felt that expanded roles such as APs lacked 'depth' in their training and that the roles were not standardised, leading to variabilities in practice (Niezen and Mathijssen, 2014). This was likely because doctors felt they hold overall responsibility for patient's care, therefore if there was variation in practice from the AP, they lost credibility and trust resulting in doctors being unable to delegate to the AP. In addition, if there was a perceived threat to the doctor's job from the AP expanding their scope of practice then autonomy was restricted (Niezen and Mathijssen, 2014, Lawler., et al., 2022).

The literature suggests that the lack of definition and standardisation for APs is a substantial issue as it causes interprofessional challenges and results in AP stagnation (Mantzoukas and Watkinson, 2007, Jones, 2005, Niezen and Mathijssen, 2014, Currie and Crouch, 2008 Egerod et al., 2021, Hardy, 2021). A mixed method study suggests that the concept of APs is not fully understood which has led to variations in its definition (Hardy 2021). This complex issue around role identity originated from its main driver during the establishment of APs, which was to fill medical workforce gaps. Manley (1997) discusses

a 'two-track perspective'; nursing or medical (Manley, 1997) in which blurring between the two specialities has caused conflicts for both professions. APs have been referred to as a 'medical replacement' or 'mini doctor' (Bryant-Lukosius et al., 2004, Niezen and Mathijssen, 2014). As highlighted earlier, doctors consider that overall patient responsibility is aligned with their role as clinical leads (Lawler., et al 2022). Therefore, one may argue that the additional skills, lack of standardisation, and varied training of APs results in extra medical supervision and added risk for doctors working in stretched environments (Niezen and Mathijssen, 2014, Lawler, et al., 2022).

Lastly, the organisation's culture dictates how an AP operates. The "legal, political and social" elements within a healthcare system all play a part in how the AP is integrated within the team (Niezen and Mathijssen, 2014). The policy which supports an AP is a factor in terms of who holds the risk, governance and accountability for the role. Further compounding this are the perceptions of an AP for the multi-disciplinary team and patients. If the role is not bought into or deemed credible, the APs autonomy is reduced. Lastly, the position of APs within the team's hierarchy and their status within the organisation can further stagnate role development.

Lack of standardisation of roles

Despite the increase in AP roles over the last 20 years, ranging from nurse practitioner to consultant nurse, there has been little in the way of standardisation of roles (Currie and Crouch, 2008, Egerod et al., 2021, Carney, 2016, Foster, 2023). A review of the international regulation of APs revealed that in many countries, the role remained unregulated, contributing to a lack of standardisation (Carney, 2016). In the UK, this

absence of standardisation and regulation prompted the establishment of the RCEM ACP credentialing pathway (Carney, 2016).

This pathway standardises and defines the scope of practice that ACPs hold when working in emergency care, facilitating clear role definition (RCEM, 2018). The work undertaken by RCEM complements the national definition for APs which outlines a multi-dimensional foundation, conceptualising the role using four pillars of practice: expert clinical practice, research, leadership and facilitating learning (RCN, 2018). Furthermore, the 'Royal College of Nursing (2018a) Standards of Advanced Nursing Practice', now refers to APs as a 'level of practice' rather than a job title or role. This represents a shift from viewing the AP as a role in isolation, the document emphasising the multidimensional nature of APs (RCN, 2018). Hardy's mixed methods study (2021) revealed there is significant complexity surrounding the understanding of AP, particularly from the perspective of professions regulated by the Health and Care Professions Council (HCPC). The intricacies uncovered by Hardy (2021) emphasise the multifaceted nature of AP. Despite the above challenges for the NMC and HCPC, the AP roles in civilian practice have continued to expand.

2.7 Military Advanced Roles

Chapter 1 describes APs within the DMS as a new concept, with their use for military deployments remaining unclear. It is apparent that each of the military services has different aspirations for APs, for example, where their role fits within the DMS workforce, which clinical nursing specialities should train APs and if APs should be Officers only. To date, with the exception of the Army, which has deployed a handful of Military Nurse

Practitioners for the Role 1 environment, there have been no other examples of APs deployed on military operations. The RAF already has qualified APs and is currently training more, both in the regular and reserve forces. It is anticipated that the RAF APs will be used for future operations with the Hospital Staging Unit (HSU). The HSU is a new medical capability to hold patients in location before medical evacuation and is yet to deploy formally. As the facility has not completed an operational deployment, the RAF APs trained for this facility are also yet to deploy. The RAF APs have deployed on other routine MERT operations in their traditional role as PHEC nurses or paramedics. Although trained as RAF APs, while deployed routinely for MERT, their role is a level 5 PHEC practitioner, and they are not recognised as RAF APs during these operations. This is because for MERT they have not explicitly been employed as an RAF AP; therefore, use of their extended skillset is not sanctioned by the RAF.

Internationally, there is little evidence relating directly to APs in military pre-hospital settings. However, Military Nurse Practitioners with different levels of advanced skills are currently being utilised in military treatment centres such as Role 1 and Role 2. An observational study of US military nurse practitioners (n=50) deployed to Afghanistan and Iraq in 2010 was conducted by Lewis, et al. (2012). The study demonstrated that military nurse practitioners, used within the Role 1 (treatment centre forward of the battle zone), provided an uplift in capability, as the role is considered flexible and dynamic. The nurse practitioner role was shown to enhance the effect of care given at Role 1 through an up-skilled workforce resulting in timely access to care in different geographical and austere settings. Lewis, et al (2012) survey found during their study of deployed AP that advanced clinical skills and decision-making positively impacted patient care. Furthermore, those

nurses used their autonomous skill sets to maintain a 'busy workload', thereby enabling

patients to be seen without undue delays in the absence of a doctor (Lewis et al., 2012).

The primary advantage for 'up-skilled' military clinicians is to provide injured soldiers with

the most timely and skilled care, which can be delivered as close to the point of wounding

as possible (Blaz et al., 2013). By placing skilled medical personnel forward of the

battlespace, patient mortality and morbidity rates have been significantly reduced

(Gerhardt et al., 2009).

2.8 Conclusion

This chapter has presented a contextual overview of AP, outlining the national and

international definitions of Advanced Practitioners, and establishes a comparative

framework between the military and civilian contexts. Since originating in the 1960s, APs

are currently educated to master's level, to deliver autonomous healthcare across the four

pillars of advanced practice: clinical care, leadership, management, and education. The

civilian adoption of APs emerged primarily in response to workforce shortages, with

additional incentives that include the retention of clinicians in clinical-facing roles and the

provision of mentorship. Despite the ongoing evolution of AP roles, some challenges

persist, including role conflict, a lack of standardisation, regulatory gaps, and strategic

inconsistencies.

Notably, AP is regulated and registered separately to their core role as a nurse in some

countries, and in the UK, efforts have been made to standardise these roles.

Nevertheless, challenges remain; these are key considerations for the military if the DMS

introduces AP. Drawing insights from the civilian experience is crucial in navigating

challenges effectively. A comprehensive understanding of the drivers and requirements

for AP implementation is imperative.

The next chapter of this thesis presents a narrative review to address some of the gaps in

knowledge on this subject. This review explores existing literature on military and civilian

AP roles working in PHEC settings, aiming to understand their scopes of practice and the

impact of their role on patient care. Furthermore, the review explores advanced PHEC

skills associated with military PHEC level 6 practice, which will help to understand which

roles could be undertaken at this level and the responsibilities of APs within this specific

context.

Throughout the subsequent phases of the study, the narrative review helps to highlight the

wider context of clinical practice, such as role boundaries and professional identity, which

have implications for this PhD research.

Chapter 3: Narrative Review of Advanced Practice in Pre-hospital Emergency Care

3.1 Introduction

Chapter 1 presented a contextual overview of the DMS alongside an outline of the current state of play on military APs, thus setting the scene for this research. Chapter 2 provided an overview of APs in the military and civilian settings, presenting the background and context to advanced practice in military settings. This chapter presents the findings from an in-depth narrative review of the literature surrounding the deployment of APs and the requirements that potentially support Defence PHEC level 6 practice. The review explored aspects related to pre-hospital APs, including their roles and responsibilities, their scope of practice, clinical competencies, training requirements, and the impact of their deployment in relation to patient outcomes and performance. The evidence gathered from the narrative review informed the subsequent phases of the study in shaping the methodology and informing the analysis and interpretation of data. This chapter first presents the search strategy used with a justification of the papers chosen before critiquing the literature.

A narrative review aims to identify and critically review the literature on the subject, before providing a synthesis on the papers (Byrne, 2016, Green et al., 2006). Narrative reviews may use multiple research questions and can provide flexibility in their approach compared to a systematic review (Byrne, 2016, Green et al., 2006). However, narrative reviews are considered less scientific when compared to a systematic review (Aveyard, 2014).

Traditional narrative reviews have been criticised for lacking replicability and explicit inclusion/exclusion criteria. Some also lack an ill-defined search strategy and thus, risk selection bias (Byrne, 2016, Green et al., 2006). To mitigate these limitations associated with narrative reviews, a systematic approach was undertaken in respect to searching and critiquing the evidence (section 3.2).

Regarding the first literature review question, Defence PHEC levels (see figure 1.2) have been agreed upon and endorsed by the UK DMS. However, the clinical practice and non-technical skills have not been formally aligned to each level or clinical role. The definitions of clinical competencies and non-technical requirements do not currently exist for PHEC levels 5/6. For levels 7/8, doctors achieve set competencies outlined in sub-speciality PHEM training via the Faculty of Pre-hospital Care (FPHC). The lack of definition relating to the PHEC levels has undoubtedly resulted in ambiguity in terms of boundaries of clinical practice, clinical competencies, training, and which medical providers should be recognised at which level (Sharpe et al., 2018). This review aims to critically examine and synthesise what is currently known on the subject. It aims to assess the research for potential transferability, to understand which skills and competencies could be aligned to level 6 care. Without a clear definition of level 6 practice, it is impossible to establish the necessary skill sets or recognition of a specific practitioner who should be recognised at this level. From chapter 1, key clinical skills associated with civilian pre-hospital AP practice include; sedation administration, blood transfusion and advanced analgesia. These advanced skills were used as a basis to begin the search for other additional skills that might be attributed to PHEC level 6 practice.

In addition, this review identifies the literature related to the work of APs in pre-hospital care by reviewing both civilian and military sources. From an initial scoping of the literature, which was drawn upon in chapter 2, civilian AP roles appear to be supported within NHS workforce strategies, with ongoing plans to continue their development in pre-hospital care (HEE, 2017, HEE, 2018, Jashapar, 2011). Outlined in the Health Education England (HEE) workforce strategy, advanced roles feature in a variety of healthcare settings, including pre-hospital care. These roles are set to grow and are a key part of NHS workforce planning over the next 20 years (HEE, 2018). Papers were focused on military and civilian APs working in PHEC roles. Exploring the impact on their roles and skills associated with advanced practice. Advanced practice skills were explored to understand different scopes of clinical practice that a PHEC AP has and how they might map over the PHEC level 6 practice.

The questions that the literature review sought to answer were broader than the research study questions to facilitate a comprehensive review of the existing literature and to encompass all aspects relevant to the research topic. Previous literature reviews completed during my MSc programme and initial scoping of the literature for this PhD did not produce any papers specifically on APs in UK PHEC settings. It was necessary to broaden the scope of these questions to not only gather insights from international military sources but also from civilian PHEC Advanced Practice studies. This broader lens was chosen to gain a wide-ranging understanding of how APs impact patient care in PHEC settings from different contextual backgrounds and to ascertain the skill sets associated with Level 6 PHEC. Additionally, the review was expanded to explore the scope of practice among APs, both in civilian and military PHEC settings, with a particular focus on

how their skills and roles influence patient care outcomes. This expanded perspective facilitated a comprehensive assessment of the factors influencing performance regarding patient care within the military PHEC context.

Below are the questions used to guide the narrative review:

1. How does the role of the AP within PHEC, both military and civilian, including international experiences impact on patient care?

2. What is the APs clinical scope of practice, including the clinical and non-clinical skills, required for advanced pre-hospital emergency care, including PHEC level 6 practice?

3. What impacts performance within the PHEC teams in terms of patient outcomes and operational timelines along the OPCP?

3.2 Search strategy

The literature review methods were structured using the following stages:

- Design and structure of the search strategy

- Search strategy development

- Inclusion and exclusion criteria for the search

- Article search and selection

- Evidence review using a critiquing tool

- Thematic analysis to synthesise the evidence and to evaluate its application to the research question

- Discussion and interpretation of the papers.

Design and structure of the search strategy

The design of the search strategy was focused on the above narrative review research questions. The questions were broken down into the following broad themes, see table 3.1.

The broad themes were used to develop key search terms derived from concepts in previous literature reviews conducted as part of my MSc and PhD proposal on the subject. In addition, these concepts were referred back to the PhD research questions to inform the design of associated synonyms/terms. Terms were entered into the MeSH database. MeSH is the medical subject headings database which can be accessed to ensure search terms cover synonyms, variations in terminology and international spellings (Cronin et al., 2008).

Table 3.1 Search Terms

Themes	Keywords	Other terms/synonyms
Deployed Advanced practice (titles, roles, scopes of practice)	Advanced Practice	Skills Scope of practice Role development
PHEC level 6 pre-hospital care both civilian services and military PHEC	Critical Care Paramedic	Competencies or Clinical Skills Non-technical skills Performance Military Army or military or Armed Forces or Air Force or Navy Mobile intensive care
	Pre-hospital care	Roles and responsibilities Scope of practice Role development Performance Key performance indicators Level of practice Competencies or Clinical Skills Curriculum Non-technical skills

International pre-hospital services military and civilian	Military Medicine	Advanced skills Advanced Practice Military practitioner Pre-hospital Clinical skills Medevac (medical evacuation) Trauma Helicopter En-route care Combat
Understand the work of APs and map over to a deployed pre-hospital setting		

These terms were entered into the following databases: CINAHL, OVID, Medline, EMBASE and Cochrane (to include systematic reviews). These databases were chosen following engagement with the Defence Healthcare Librarian based at DMS Lichfield. The DMS librarian was utilised to provide additional expertise in the search. The search terms were entered into CINAHL, OVID, Medline, EMBASE and Cochrane. Boolean operators were employed to organise keywords, combine terms and use synonyms to ensure the search was bounded and focused against the research questions. A manual search was undertaken using the Google search engine and reference lists from key papers were scrutinised. No additional papers were found using the manual searches. An inclusion and exclusion criteria were applied.

Inclusion and exclusion criteria

Inclusion and exclusion criteria bound the search and ensured that it focused on the research question (Aveyard, 2014). The inclusion and exclusion criteria and a detailed justification are outlined in table 3.2. The criteria were developed to provide a transparent overview and explanation of decisions that influenced the review. In addition, this framework can be used as an audit trail for subsequent researchers repeating the search.

Papers published before 2004 were excluded since most developments in advanced pre-hospital skills (particularly in trauma) occurred after 2004. In the UK, from 2007, targets were set for the ambulance service by the Care Quality Commission for clinical outcomes, time to treatment, levels of mortality and patient satisfaction. Collectively these performance targets have resulted in different innovations; up-skilling personnel was one of the solutions to bring experience and expertise to meet the challenges set (Jashapar, 2011). Papers on the AP role from military backgrounds, including international militaries, were included. This, for example, widened the search to include papers from US military deployments in Afghanistan where Critical Care Flight Paramedics (CCFP) were deployed. Research relating to civilian AP roles was included. This was due to the civilian APs in pre-hospital care evolving beyond the military development. As discussed in chapter 2, UK PHEC APs were developed in response to emergency care challenges. UK pre-hospital care has rapidly developed AP roles in a variety of areas, specialising in both urgent and critical care (von Vopelius-Feldt et al., 2013, Evans et al., 2014, Sharpe et al., 2018). Comparatively, civilian pre-hospital care differs from the military; the austere working conditions in high-threat combat environments, dealing with traumatically injured patients from blast mechanisms, is thankfully not a regular occurrence in UK civilian practice (Reed and Bourn, 2018). However, in the absence of limited evidence on military UK AP roles, civilian Critical Care Practitioner (CCP) roles most closely fit. Literature about this group of practitioners had useful evidence that was used to explore extended practice in this area. As discussed in Chapter 1, CCPs undergo advanced training to obtain specialist competencies beyond those held by paramedics and pre-hospital nurses. It was considered the CCP skills are likely to exceed PHEC level 5 related scopes of practice in Defence pre-hospital care and potentially fulfilling the competencies of PHEC

level 6 and beyond. Therefore, the evidence base within the civilian sector was considered transferable to military APs as it would have implications and insights towards the possible future development of APs. The civilian experiences regarding role definition and professional boundaries were helpful to consider.

Roles relating to pre-hospital care in military and civilian environments included both nurses and paramedics. The literature review was not restricted by research design, so that peer reviewed papers, qualitative and quantitative empirical designs, as well as systematic literature reviews and opinion pieces, were included. Due to the limited evidence on the subject area, it was imperative that all study designs and papers (such as opinion pieces) were included. The studies that evaluated skills and performance for technical/non-technical care were included. For example, technical skills include airway interventions such as intubation, and non-technical skills include communication and leadership.

The following exclusion criteria were applied to the search; papers from before 2004, specialist areas that do not apply to pre-hospital and emergency care, such as surgery or community healthcare settings, as these were not relevant to the military pre-hospital environment. Articles written in languages other than English were also excluded.

In reference to military AP roles, previous literature searches highlight a significant gap concerning UK military advanced practice in this area (Paxman et al., 2021). Most of the research to date is primarily from nurse practitioners' deployments to Role 2 (treatment centres placed near battle zone) settings, which measured the effectiveness of deployed APs using retrospective and prospective-based designs (O'Neill and Luther, 2013, Blaz et

al., 2013, Lewis et al., 2012, Dargis et al., 2006). Papers used descriptive analysis, observation and patient data to assess clinical impact and effectiveness within the workforce. To ensure the literature review was specific to deployed pre-hospital care the search was bounded to this area of speciality. Deployed Role 2, Role 3, primary and secondary healthcare specialities where APs were deployed were not included. The review focused on papers that specifically investigated military pre-hospital roles and skill sets. The inclusion and exclusion criteria ensured the review remained focused on deployed medevac capabilities, investigating additional skills in pre-hospital care.

Table 3.2 Inclusion and Exclusion criteria

	Inclusion	Justification
Focus	Evaluating skills and performance for technical/non-technical care	Papers that focused on advanced skills in PHEC above level 6 practitioner.
Year	From 2004 onwards	As developments in Pre-Hospital advanced skills, particularly in trauma, were after this date, (Aveyard, 2014) suggests reviews should be limited to 10 years however the significant developments in trauma span further and 15 years was chosen to ensure that seminal works were not missed
Language	English language only	The reviewer was unable to access translational services, without specialist translation this may impact on the accuracy of the data. Papers written in other languages were excluded
Clinical setting	Civilian and Military Pre-hospital and Emergency care	Specialist clinical area of interest
Study setting	International context	Given the limited availability of data in the UK, international studies were considered vital to build a broad knowledge base on the subject

Study design	Empirical designs, peer reviewed studies, systematic and literature reviews. abstracts. Opinion papers.	Different methodologies were considered to provide a broad overview of the evidence in the area
	Exclusion	**Justification**
Year	Before 2004 onwards	Limited evidence on these roles prior to this date, most of the evidence concerning advancing paramedic roles were developed after the Trauma Who Cares review in 2007 (Jashapar, 2011). Afghanistan and Iraq wars were after 2001, development of these roles were after this date
Language	Other languages	Due to the limited availability of translation sources, it is unlikely that papers in other languages will be translated accurately and may, therefore, lose meaning
	Areas outside of Pre-hospital and Emergency care	Other specialist areas, such as surgery or medicine, as not transformable to PHEC and the emergency setting

3.3 Literature review results

From an initial search, which yielded 1212 papers, 53 duplicates were removed which resulted in 1159 papers (Figure 3.1). These papers underwent a screening of article titles, followed by a reading of the abstract to ascertain their relevance to the questions set out at the start of the narrative review. This initial screening aimed to establish the relevance of the paper to PHEC in both military and civilian contexts and their relevance to AP roles, skills, competence, and performance in relation to patient outcomes. After this initial screening, a set of 157 papers was identified. This subset underwent a more detailed assessment against the above inclusion and exclusion criteria. These papers were

reviewed to identify key themes and common findings that were applicable to the research questions, resulting in a subset of 109 papers. These papers were then subjected to a full text review, where their inclusion, strengths and limitations were aligned with the questions for the narrative review and overall aims of the PhD. Full details regarding the database search strategies can be found in Appendix 1. The search was updated in October 2022 and again May 2023, which resulted in one extra paper. This led to a final total of 15 papers, which were subjected to critical analysis.

Figure 3.1 PRISMA diagram - Literature Search and Screening
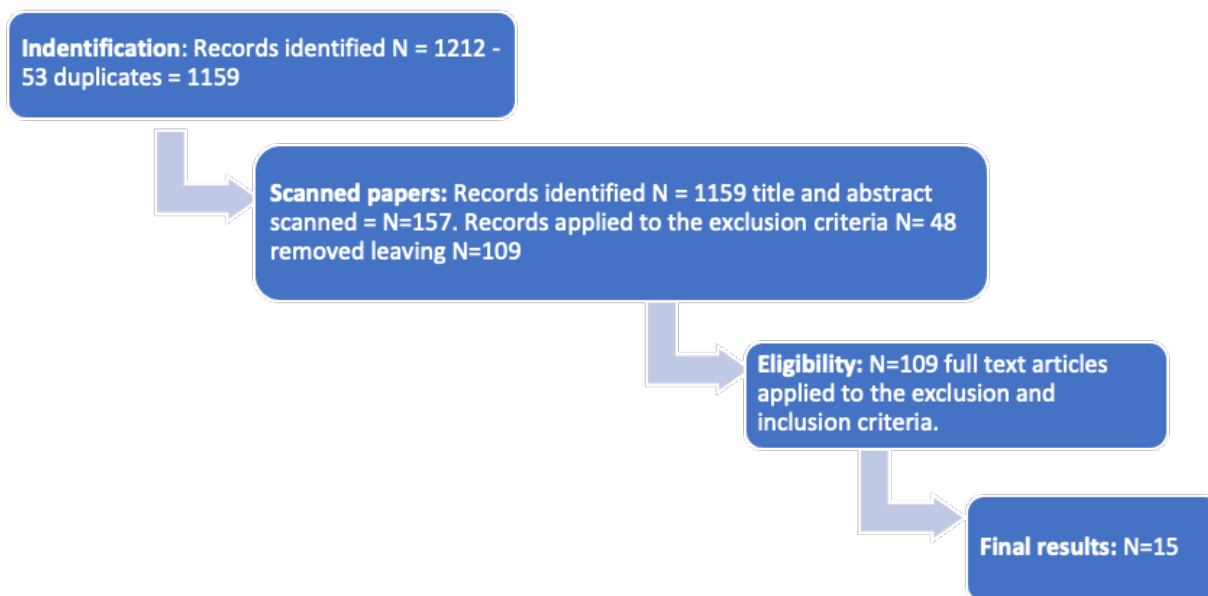
Summary of Papers

The majority of the studies were identified from the hierarchy of evidence (table 3.3) on a scale of 1-6, with 6 being the best evidence. Most of the studies were level 2 cohort, case-controlled and observational studies. Levels of evidence were originally conceptualised in 1979 by the Canadian Task Force on the Periodic Health Examination (Burns et al., 2011). It was developed to provide a systematic way of rating evidence. Levels of evidence aim to help to inform practice by providing a guide to selecting the best available evidence for clinical care. The levels were developed further by Sackett in 1989 (Sackett, 1989). The hierarchy of evidence pyramid considers systematic reviews as the highest-rated study. See table 3.3, which presents the hierarchy of evidence table with the literature from this narrative review allocated. The levels table enables the researcher to distinguish between lower and higher levels of evidence for quantitative research. However, it is important to note that it does not provide assurance against the quality of the evidence. Ultimately the best available evidence depends on what applies to the research question being asked. It would not be the case that level 6 evidence would automatically fit every research question, just because it's rated highest. Evidence still needs to be scrutinised to ensure it is of the quality to answer the questions set out for the review (Sackett, 1989). Most of the papers for this review were from level 2 studies which are considered acceptable to answer the questions set out at the beginning of the search (CEMB, 2009). In terms of opinion papers these were read critically to assess the validity of the authors' arguments. Although opinion articles are based on low grade evidence there were important themes that were useful to consider in relation to the PhD research questions.

Table 3.3 Hierarchy of Evidence

Levels of evidence	Examples	Number of papers
Level 6	Meta analysis	0
Level 5	Systematic Reviews	1
Level 4	Critically appraised topics	2
Level 3	RCT	0
Level 2	Cohort, case control and observational studies	9
Level 1	Case reports, opinion articles	3

From the 15 papers included in the review, studies measured the impact of APs on patient mortality and opinions of the role regarding leadership, communication, and clinical care. The majority of the studies used either retrospective or prospective methodologies to undertake research in this area. The review also included a systematic review, literature review and opinion papers. The study settings included a US military background (n=6), UK military (n=7), and civilian pre-hospital care (n=2).

The majority of the evidence consisted of prospective studies (Calderbank, et al., (2011), Apodaca, et al., (2013), Morrison, et al., (2013), Lairet, et al., (2019), retrospective studies (Mabry, et al., (2012), Holland, et al., (2013), Galvagno, et al,. (2018), Maddry, et al., (2016)) and literature reviews (Davis,et al., (2007), Von Vopelius-Feldt, et al., (2013), Sharpe et al., (2018). A data triangulation study (Von Vopelius-Feldt, et al., 2013), compared competencies for paramedics, doctors and CCPs, to gather information from log sheets, direct observation of clinical practice and surveys. There were three opinion papers (Thompson et al., (2022), Paxman et al., (2021), Royal et al., (2020), which were judged to be low-quality research as they do not contain empirical evidence (Aveyard,

2014). Although retrospective and opinion papers add some evidence towards the research questions, there are limitations of such research, as they often lack the methodological rigour, for example, in quantitative prospective studies. Despite these limitations, they can still provide valuable insights for this review. However, their utility needs to be critically assessed against their limitations.

Retrospective papers are limited since they rely on historical data rather than collecting new data (Aveyard, 2014). This limitation arises because retrospective studies draw from data collected for other purposes, such as medical records or databases, rather than gathering data specifically for the study. As a result, this historical data may not align perfectly with the research questions, potentially presenting gaps and challenges in generalisability.

Opinion pieces are authored by experts in the field who draw upon their extensive experience and broader literature, contributing valuable insights applicable to the research questions. However, it's crucial to note that these opinion pieces do not constitute primary research data from empirical studies. Consequently, they adopt a subjective approach, carrying the risk of bias from a particular perspective. While expert opinion papers offer valuable findings, they must be critically interpreted in light of this subjectivity.

The absence of empirical mixed methods, qualitative, prospective, and Delphi studies presents a notable gap in the existing research relating to military PHEC APs. Building on retrospective and opinion papers in this field by utilising the above research methods offers diversity to build new knowledge in this area. Exploring the research topic with different methodological approaches facilitates a broad evaluation of the research area, generating additional findings. For example, a Delphi study involves generating expert consensus and incorporating stakeholder and specialist perspectives (Okoli and

Pawlowski, 2004), while qualitative studies provide rich contextual data, including understanding experiences and insights (Garner and Scott, 2013). These aspects are not captured in opinion or retrospective studies. The incorporation of these empirical methods enhances the rigour and robustness of evidence, especially when triangulated using mixed methods, providing a complete picture to answer research questions, particularly when addressing complexity associated with healthcare research (O'Cathain et al., 2007). Building on the findings from the narrative review, further research in this area should incorporate empirical research designs. The additional methods will enhance the methodological rigour to build on the understanding of the subject area. To address this gap, this PhD adopted research designs that had not been previously applied to UK APs in military PHEC.

Critical Appraisal

Systematic review papers were critiqued using checklists from the critical appraisal skills programme (CASP) (See table 3.4 summary table of literature). CASP was formed in the 1990s as part of the evidence-based practice movement. CASP provides user-friendly individual checklists for qualitative and quantitative designs for use by novice researchers during critical appraisals of the evidence (Aveyard, 2014). The CASP checklists assist with appraising papers to assess the quality of the study. The checklists provide a tool to review the validity, results and their application of a study for the research question. Using CASP enables a systematic review of the papers, starting with an initial screening to assess the relevance against the question before moving on to detailed questions to assess the methods used for the study.

The retrospective studies were reviewed by adapting the CASP checklist, as there was not a specific CASP checklist for these designs. The critique of each paper focused on an assessment and analysis of the study objective, rationale, sample, data quality, bias, analysis, relevance to the question, ethical issues, generalisability, discussion, and recommendations. Whilst opinion papers are not considered as the same quality as other empirical studies they were included in the review. The opinion papers were analysed for credibility. Credibility was assessed by reviewing the author's background, field of expertise, experience, previous publications, and qualifications. Additionally, the reputation and academic ranking of the journal in which the article was published was considered. Next, the references that were cited were evaluated to ascertain credibility. Lastly, the objectivity of the author's opinion was assessed to check if there was a balanced and logically presented argument.

Braun & Clarke thematic framework

Following the critique of papers using CASP, evidence for the included literature for this review was analysed and synthesised using a six-step thematic approach (Braun et al., 2019). The Braun & Clarke thematic framework (2019) is developed and used for empirical qualitative data analysis. However, such approaches have been applied to reviews to assist with data syntheses (Lucas et al., 2007). It is argued that this framework can be used outside its traditional intended purposes to facilitate the conceptualisation of the literature and generate theories during the synthesis phase of the review (Horntvedt et al., 2018). This is a flexible method that was chosen to help identify repeated themes from the data which were presented within the results section of this review. Braun & Clarke supports using a theoretical analysis, where the researcher can codify the research from a

theoretical stance. In addition, this thematic analysis approach was applied to Phase 2 of the study which provided a consistent approach to the data throughout each of the phases of the PhD. Adopting one approach for each method of study assisted with a full familiarisation with Braun & Clark's analysis framework to ensure a comprehensive methodology towards researching the questions set out at the beginning of the thesis. The results from the literature review were then evaluated against the initial research question to assess if the findings generated new knowledge on military APs within deployed pre-hospital care.

3.4 Overview of the included literature

This section provides a brief overview of the papers included in the review before presenting the thematic analysis findings (Table 3.5 provides a summary of the literature). It should be noted there is a lack of empirical research throughout the review. Three articles are opinion pieces, and there were 12 empirical studies. This is important to emphasise as there was a limited amount of empirical evidence which was available on the topic. Empirical evidence includes studies based on direct observation, experiences, and other data collection methods such as prospective studies. The aim of including empirical evidence is to ensure objective conclusions can be drawn. This is a limitation of the review and therefore the chapter has reviewed other types of information to inform conclusions.

From the US studies, three papers specifically analysed skill sets of evacuation providers on medevac platforms during deployments in Afghanistan (Mabry et al., 2012, Maddry et al., 2016, Holland et al., 2013). Each US paper used a retrospective approach to review

the data from medevac missions. The papers directly investigated skill sets from different roles, including critical care flight paramedics, flight nurses and emergency medical technicians. The most relevant study for this review was undertaken by Mabry et al. (2012) since it reviewed advanced roles in a military PHEC and their impact on patient mortality. The paper analysed patient outcomes at 48 hours, reviewing the impact of clinical interventions and comparing performance from different levels of advanced providers. In a subsequent retrospective comparative study, Holland et al. (2013) measured the effects of additional trained personnel by reviewing 48-hour mortalities and physiological parameters. The study compared Critical Care Flight Paramedics (CCFPs) with Emergency Medical Technicians (EMTs). Lastly, Maddry et al. (2016) retrospectively reviewed medevac records from Afghanistan. This research used a 30-day outcome for patients to measure the effectiveness of clinical interventions against the medevac provider type.

Six UK studies were identified as relevant for inclusion in this review. Three were opinion articles, with two reviewing the role of military APs (Royal and Smith, (2020); Paxman et al., (2021). A further opinion article was related to the team composition of the Medical Emergency Response Team (MERT) (Thompson et al., 2022). The review also included a literature review by Davis et al (2007) and a prospective study by Calderbank et al (2011). These studies focused on evaluating the physician role and the effectiveness of their additional skill set. Lastly, an additional opinion paper was published in 2022 defining the capabilities of UK PHEC (Thompson et al., (2022).

Civilian papers were included due to the lack of evidence from the UK on military AP roles in pre-hospital care. The search yielded two relevant articles which focused on the above

themes in relation to CCPs, both written by the same author, Von Vopelius-Feldt et al (2013).

Lastly, papers that identified clinical performance and team composition in military pre-hospital care were included in the review. The notion of clinical performance is broad and covers a range of areas. Therefore, the review specifically focused on aspects of clinical interventions, timelines and team composition to understand what additional skill sets and roles make the difference to combat patients.

Table 3.4 Summary of literature

Author(s) Year Published	Aims	Method	Year Data Collected	Sample	Detail
Thompson et al. 2022	Opinion article on military PHEC capabilities	Opinion	n/a	n/a	Defining capabilities in deployed UK military pre-hospital emergency care
Paxman E et al 2021	Opinion article on AP in military PHEC	Opinion	n/a	n/a	Explores the AP role in military PHEC and outlines the possible utility in level 6 pre-hospital practice, describing the range of skills and scopes of practice an AP could offer
Royal et al 2020	Opinion article on NMPs deployed on Exercise	Opinion	2018	n/a	Reviewed the role of a Military Nurse Practitioner (NMP) deployed as part of a Pre-Hospital Treatment Team (PHTT) during Exercise Safe Sareea 3.
Lairet, et al 2019	Describe the incidence of specific pre-hospital interventions	prospective observational	2009-2014	2106 patients	The paper prospectively evaluated interventions and injuries on patients transferred to specific facilities in Afghanistan. The study excluded patients who were detainees and those that had been transferred to hospitals outside of the specified receiving units.
Sharpe et al 2018	Set out to demonstrate, using existing literature, consensus and doctrine that the NHS Skills for Health framework can be reflected	Review article	n/a	n/a	A literature review which identified 5 full-text articles (2 are included in this review, Von Vopelius-Feldt, et al

	in military pre-hospital care and provides an existing model for defining the levels of care our providers can offer.				2013,Morrison, et al 2013)
Galvagno, et al 2018	Nine quality assurance metrics were assessed	retrospective interrupted time series analysis	2009, 2014 and 2015	1008 patients	A retrospective interrupted time series study between 2009, 2014 & 2015; times that were purposely sampled as the medevac assets were under the supervision of a medical team.
Maddry, et al 2016	Data abstracted included injury description, provider type, procedures performed, medications administered, survival, and 30-day outcomes	Retrospective	2011-2014	1237 patients	A retrospective review of 1237 medevac records between 2011-2014 from Afghanistan, focused on 30-day patient outcomes.
Von Vopelius-Feldt, et al 2013	A systematic search of electronic databases was performed: CENTRAL, EMBASE, MEDLINE (through EMBASE and Web of Knowledge) and Web of Science (through Web of Knowledge)	Systematic search	n/a	n/a	systematic review to investigate the evidence concerning CCP delivered critical care in the pre-hospital setting
Von Vopelius-Feldt, et al 2013	Aims to describe the clinical competencies of three groups of pre-hospital providers in the UK to inform future planning of the delivery of PHCC.	data triangulation approach	2013	389, 441 and 449 competencies for paramedics, CCPs and PHCC physicians	Comparison of competencies for paramedics, doctors and CCPs. Using a data triangulation approach, information was gathered from log sheets, direct observation of clinical practice and surveys.
Morrison, et al 2013	Characterise modern point-of- injury (POI) en-route care platforms and to compare mortality among casualties evacuated with conventional military retrieval (CMR) methods to those evacuated with an advanced medical retrieval (AMR) capability	Data collected from prospective data sets	2008-2011	(n = 1054; 61.2%)	US and UK military authored perspective paper obtained data from the same 3 medevac capabilities deployed in Afghanistan (MERT, Pedro, Dustoff). Data were obtained from the UK and US JTTR databases. The final sample of records included 2,818 patients, distributed between the two medevac cohorts; CMR 628 and AMR 1093, the remaining 1097 patients were excluded as they were not transported by either asset.
Holland, et al 2013	Determine if a higher level of Army flight medic (AFM) training was associated with the improved physiological state on arrival to a combat support hospital (CSH)	retrospective study	Dec 2007-Nov 2008 and Nov 2010 - Aug 2010	788 patients	Compared CCFPs to EMTs deployed in Afghanistan. Using the JTTR, data were extracted on all patients with an ISS > 16

					transported on US medevacs, again using a natural rotation of the provider team. Excluded data comprised patients with an ISS <16, detainees, prisoners and non-trauma presentations
Apodaca, et al 2013	Characterise the nature of injuries in patients transported by three evacuation platforms. In addition, it aimed to compare observed versus predicted mortality among these provider groups	data collected from prospective data sets	2009-2011	n/a	A performance improvement study reviewed medevac records from both the US and the UK via the JTTR
Mabry, et al 2012	This study compares mortality of patients with injury from trauma between the US Army's standard helicopter evacuation system staffed with medics at the Emergency Medical Technician Y Basic level (standard MEDEVAC) and one staffed with experienced CCFP using adopted civilian helicopter emergency medical services practices.	Retrospective	2007-2010	671 patients	Reviewed the effectiveness of (Critical Care Flight Paramedics) CCFPs by obtaining data from the US Joint Theater Trauma Registry (JTTR) during operations in Afghanistan.
Calderbank, et al 2011	To quantify the doctors' contribution to the Medical Emergency Response Team Enhanced (MERT-E)	prospective log	Jul-Nov 2008	429 patients	Aimed to establish the 'optimal' skill mix for MERT, explicitly focusing on the addition of a doctor and associated benefits
Davis, et al 2007	To determine the optimal composition of the pre-hospital medical response team (MERT) and the value of pre-hospital critical care interventions in a military setting, and specifically to determine both the benefit of including a doctor in the pre-hospital response team and the relevance of the time and distance to definitive care	Literature review	Feb-07	n/a	UK literature review of 15 articles aimed to determine the best composition of a MERT

3.5 Thematic Analysis of literature review findings

Thematic analysis was used to synthesise the literature and identify themes within the study. Using the 6-step analysis, thematic analysis notes were made on each of the papers to facilitate thoughts and initial impressions. The studies were then reviewed

multiple times to identify common themes within the papers. Combining the critique and the thematic analysis from the literature generated hypotheses leading to the formation of themes and sub-themes. These themes include; Advanced Pre-Hospital Roles, Advanced Skills, and Performance of Pre-Hospital teams and are presented in the following sections. Table 3.5 provides a summary of the themes and sub-themes identified from the narrative review.

Table 3.5 Themes from narrative review analysis

Theme	Sub-Theme	PhD Research Question
Advanced Pre-Hospital Roles: scope of practice and impact on patient care.	PHEC deployed AP roles PHEC Civilian AP roles nurses, paramedics, Critical care flight paramedics Autonomous practice	RQ2
Advanced Clinical and Non-Technical Skills above PHEC level 5 pre-hospital providers.	Airway management Sedation Advanced Life Support Haemorrhage control Clinical decision making Leadership Training Clinical exposure	RQ1
Performance of pre-hospital teams and impact on patient care.	Operational timelines Reducing mortality Reducing time to damage control surgery	RQ 1 & 2

Advanced Pre-Hospital Roles: scope of practice and impact on patient care

This theme focuses on advanced practice roles in military and civilian pre-hospital settings. The review identified eight papers (n=3 military US, n=3 military UK and n=2 UK civilian) that were relevant to this theme.

International AP roles

Mabry et al. (2012) undertook a retrospective review of Critical Care Flight Paramedics

(CCFP) using the JTTR database. CCFPs are mainly from a US paramedic background

that have received additional training to extend their scope of practice. The JTTR is a US

database which holds prospectively collected data relating to patients' demographics,

injury patterns and treatments throughout their journey along the evacuation chain. The

aim of this retrospective study was to compare 48-hour mortality rates between two

helicopter provider teams with different skill levels: Army EMTs versus CCFPs. A

convenience sample was chosen using 8-12-month rotations of different provider teams,

EMT and CCFP. Data were searched from 2009 to 2011 and included 26,000 records

which were interrogated against the inclusion criteria to identify a total of 671 patients.

The EMT team transported 60% (n=469), and the CCFP transported 40% (n=202) of

patients. Injury Severity Score (ISS) is used widely in military and civilian trauma to give a

total score of all of the injuries the patient has sustained (0-75). An ISS that exceeds 15 is

considered to indicate major trauma. Marby et al. (2012) found that all patients had an ISS

of over 16, with mode scores of 24.8 for EMTs and 25.4 for CCFPs. However, even

though the EMTs transported more patients with an >ISS 16, the CCFPs reduced mortality

in their cohort of patients. The CCFP had an 8% lower mortality rate compared to the

EMTs' score of 15%. After adjustments and following logistic regression analysis, the

patients transported by CCFPs had an overall 66% reduced mortality risk when compared

with EMTs. The authors directly attributed the correlation of the lower risk to patient

mortality to the advancement in training and experience of the CCFP group replicated in

the civilian US air ambulance model.

The lower mortality rates associated with CCFP led medevacs are linked to several factors. On average, each CCFP has nine years of clinical experience. While not deployed, they maintained their clinical skills in the civilian pre-hospital environment. Furthermore, they received ongoing clinical training and supervision from a senior 'medical physician'. This is in stark contrast to the EMT group, who previously received training for one year and did not receive the additional medical supervision the CCFP had. It is concluded from this study that there seems to be a direct correlation between positive clinical outcomes for patients when treated by an 'up-skilled clinician'.

A retrospective study by Maddry et al. (2016) focused on 30-day outcomes, grouping medevac providers as 1. EMT, 2. paramedic and 3. advanced providers (ADV), which included nurses, physicians and physician assistants. The outcome measurements were then correlated to a specific medevac provider. The cohort breakdown by medevac providers is as follows: EMT = 76% (n=940), paramedics 21% (n=257) and ADV 3% (n=40). To reduce the risk of bias, data were selected using an independent researcher. Outcome data included vital signs monitoring, complications, days on a ventilator, length of stays in intensive care and hospital, mortality, and discharge location. The paper observed that only combat soldiers were used to generate data for the study. Unlike Mabry et al. (2012), not including civilian patients would have likely impacted the types of clinical interventions undertaken. This is because a military cohort is likely to be wearing body armour, which could account for the relatively low overall ISS of 14 in the study. An ISS of 14 is not considered major trauma and is likely to represent a low injury profile in the context of a combat environment. Therefore, this sample of patients may not have required the advanced skills and aggressive management seen in the civilian cohort in

Mabry et al. (2012). In addition, the average flight time of the medevacs was around 22 minutes. This short period of time is likely to have led to fewer incidences of undertaking advanced skills such as intubation or chest drains, as helicopters would probably have arrived at the hospital before it was possible to complete the procedures. Patient deaths were excluded from the sample, suggesting a limitation in terms of generalisability in relation to mortality data when compared to Mabry et al. (2021) study. The split of patients from each medevac practitioner is not evenly distributed. These factors may explain why no difference was observed in the 30-day outcome between the providers.

In addition, the paper referenced Mabry's paper which noted that in their study, the CCFP team had a higher mortality rate. The increased rates of mortality were as a result of the higher ISS patients transferred by the team. These more severely injured patients were higher likely as a result of a civilian cohort of patients included in the sample. Civilians were unlikely to wear body armour and therefore less protected at the time of their injuries. The ADV group consisted of nurses, physicians and physician assistants; without the complete breakdown of skills for each of these roles being acknowledged, it could be surmised that there is likely to be a significant difference between the scopes of practices for each discipline. The patient distribution for the ADV cohort accounted for 4% and, therefore, cannot provide statistical data to conclude. Despite the limitations, this study is important in this literature review because it highlights an association of advanced training with improved patient care seen in the measurement of mortality. In addition, this study opens up a narrative on advanced skills, including analgesia, blood transfusion, chest drains and airway management.

A further paper by Holland et al. (2013) focused on a 48-hour mortality rate, and physiological parameters were analysed to compare CCFP with EMTs. The impact was measured by reviewing vital signs, hematocrit (HCT), base deficit (BD), and oxygen saturation (SpO2). Patients included in the study (n=788), were split between CCFP (n= 222) versus EMT (n= 449). An overall lower 48 hours mortality was seen in the CCFP group. In total, 11 patients died (5%) in the CCFP cohort compared to 71 (16%) in the EMT group; following statistical analysis a 72% reduction of death was found in the CCFP patients. These results are directly comparable to the Mabry et al. (2012) study. To limit the risk of bias, further analysis was conducted in regard to the breakdown of ISS subsets, ISS for the EMT = 25.00 and CCFP = 25.34. An independent t-test found there was no statistical difference between the split of ISS between the two groups. In terms of physiological parameters, there was no difference found in the comparison of vital signs between the two cohorts. However, the HCT, BD and SpO2 showed a statistical difference ($p<0.05$). HCT was found to be the most statistically relevant parameter between the EMTs and CCFP ($p <0.001$). Consideration of these results needs to be balanced with the limitations of the paper. A fundamental flaw is the inability to differentiate treatments completed prior to the medevac arriving. This is particularly problematic in the measurement of HCT. If the patient had received intravenous fluids, either blood or saline before the medevac provider arrived, it might adversely affect the reliability of the result. This would produce either a concentrated or dilutional level attributed to the type of fluids administered. For example, if a ground medic completed the fluid resuscitation, the result cannot be attributed to the medevac provider as this intervention was conducted prior to the helicopter's arrival at the scene.

Despite the limitations, the study compared mortality and physiological differences following the advancement of flight training; the results are similar across all three papers. It is concluded that additional training and experience were associated with improved patient outcomes.

UK military AP roles

From a UK military perspective, two opinion papers were published in 2020 and 2021 (Royal and Smith, 2020, Paxman et al., 2021). The Paxman et al (2021) paper was published by myself. These were included despite the limitations of including opinion articles as they offer important early considerations and insights about the military AP role in the UK. Royal et al. (2020) reviewed the deployment of Military Nurse Practitioners within a Pre-Hospital Treatment Team during a military exercise. Pre-Hospital Treatment Team is a small, flexible team that has a clinical lead that can prescribe medication, either deploying general medical Officers or Military Nurse Practitioners. The role was assessed against the four pillars of advanced practice (leadership, clinical practice, quality improvement and research). Notably, the paper mentions the impact of clinical decision-making and the experience of a senior military nurse. From a clinical perspective, Military Nurse Practitioners were reported to add value in primary and pre-hospital care for patients presenting in the field with a range of clinical presentations. The paper notes that the role is continuing to evolve, and the opinion of the authors suggest the use of telemedicine to further enhance the capabilities of a lone Military Nurse Practitioners by providing support and empowerment through reach back (support via virtual means when deployed in remote areas, for example, telemedicine). Paxman & King's opinion papers note that the UK military AP role is in its infancy however, a common theme highlighted the

degree of flexibility the role offers (Royal and Smith, 2020, Paxman et al., 2021). From an Military Nurse Practitioners perspective it is mentioned that the role can split and form the clinical lead in a separate Pre-Hospital Treatment Team or augment one Pre-Hospital Treatment Team alongside a medical Officer. From Paxman et al., (2021) a similar theme is mentioned that an AP could split from a level 8 PHEC led team to form a level 6 team led by an AP.

Civilian AP PHEC roles

Civilian Pre-Hospital Care Advanced Roles were explored in a systematic review that grouped papers into three main themes: CCP compared to physician-led care, CCP compared to non-physical care, and CCP competencies (von Vopelius-Feldt et al., 2013). In the first group, five papers compared CCPs to physicians, three demonstrated improvements in care delivery and patient outcomes from physician-led teams, and two showed no benefit from either the physician or CCPs leading (von Vopelius-Feldt et al., 2013). Overall management, in combination with additional competencies, inclusive of blood transfusion and neuromuscular blocking medication, were found to impact a patient's survival in the physician-led group. Two studies demonstrated no differences in patient outcomes from CCPs compared to physicians; these papers originated in Australia and the US. The review by Von Vopelius-Feldt et al (2013) found four subsequent papers comparing CCPs to non-physicians and found improved outcomes in three studies. In both groups, the levels and scopes of practice for each role were not described and, therefore, may not be comparable since different countries have different levels of practice. For example, in Australia, CCPs are called Mobile Intensive Care Ambulance (MICA) paramedics with extended critical care skills, including PHEA, and they are

dispatched to major trauma (von Vopelius-Feldt et al., 2013). The lack of comparability in the roles may result in the findings lacking generalisability and being unable to draw conclusions across papers. In addition, it highlights the variabilities of training and practice. The last three papers outlined in the review focused on the additional competencies CCPs hold: PHEA, thoracostomy and non-invasive ventilation. In the UK military, these additional skills are reserved for PHEM levels 7-8.

In summary, this paper has several limitations despite being considered the first systematic review of its type reviewing the evidence concerning CCPs. The literature obtained in the review was inconsistent in quality, with some studies accused of possible publication bias concerning negative results not being fully presented or even published. Despite these limitations, the review concludes that the evidence demonstrates improved survivability for severely injured patients when treated by a CCP over and above pre-hospital nurses and paramedics. In terms of CCPs versus physician-led care, these results are not clearly defined and are therefore inconclusive. The paper recommends continuous training, clinical exposure, and governance to ensure consistency and reliability in delivering critical procedures from CCPs.

Advanced Clinical and Non-Technical Skills above PHEC level 5 pre-hospital providers

This theme focuses on advanced clinical and non-technical skills above PHEC level 5 pre-hospital providers. Papers included in this theme were from a US, UK military background, and a civilian study (n=4 papers). Across all four papers, specific skills included advanced airway management, haemorrhage control, sedation, blood transfusion and advanced life support. Non-technical skills were described, including leadership and

communication and these skills were reviewed against patient outcomes. In addition, it was found that training pathways and clinical competence to enable competence in skill performance were associated with better patient outcomes.

Maddry et al. (2016) found that advanced skills were more likely to be performed in the ADV cohort and were associated with advanced training, including intubations. However, other skills highlighted as 'advanced' with additional training included chest needle decompression, hypothermia mitigation, advanced analgesia, such as fentanyl/ketamine and blood transfusion. These skills in UK military PHEC practice are within a level 5 skill set and therefore not considered 'advanced'.

In terms of physician-led skills, Davies et al. (2007) reviewed papers from international sources, including civilian/military and grey material. Grey literature accounts for non-academic sources; it could be a leaflet or a report. Most papers reviewed were undertaken prior to 2007 and did not include any advanced roles such as CCFP. This UK paper was included in this thesis review as it explored correlations between advanced skills and associated patient outcomes. In addition, it could be argued that advanced roles for military UK nurses and paramedics would not have existed, or at best, would have been in their infancy, during that time. Davies et al (2007) concluded that including a doctor with advanced skills improved patient outcomes. These additional skills included PHEA, ventilation, intercostal drainage and blood transfusion. These advanced skills are defined in PHEC level 6 except for PHEA, which is considered a level 8-only skill (Sharpe et al., 2018).

A further paper used a prospective log between July and November 2008 to record missions, review interventions and conduct qualitative analysis on the team's opinion if there was a consensus that the additional treatment interventions "added value" (Calderbank et al. 2011). A doctor flew on 88% of the MERT missions (patient n= 429), and the average flight time was 44 minutes. A longer flight time facilitates critical care interventions to be conducted. In 77% of the cases, the doctor did not add any additional clinical value above the other team members, measured by the interventions performed. Of the 23% of patients who did receive interventions by the doctor, 62/429 were considered physician-only skills. These included PHEA (45%), blood transfusion, sedation, analgesia (34%), chest drain & thoracostomy (5%), and pronouncing life extinct (6%). The authors noted that a small proportion of these interventions could be performed by a 'well-trained military paramedic or nurse' but did not define what this training might be. As the roles of CCP or AP did not exist then in the DMS, the study does not contribute to a greater understanding of the advanced practitioners who might perform these skills.

In addition to the analysis of mission and treatment data, post-medevac mission debriefs were conducted. Teams were asked if they felt the doctor had impacted positively on the mission, and their collective opinion was recorded. In 25% of the missions, the team felt the doctor 'added value' through offering leadership, reassurance, triage and their application of clinical judgement. However, the definition, evaluation and measurement of non-technical skills are problematic. Since the publication of this paper, further work has been undertaken to define and measure Non-Technical Skills specifically required for the pre-hospital environment (Myers et al., 2016). Therefore, if a similar study to Calderbank et al. (2011) were to be repeated, the qualitative data on Non-Technical Skills could be collected more accurately using the Non-Technical Skills framework developed by Myers

et al (2016). In addition, if the qualitative data were collected using the Non-Technical Skills framework, it may have provided a detailed picture of the doctor's Non-Technical Skills contribution to the MERT.

Calderbank et al., (2011) is the only paper that has attempted to measure the impact of Non-Technical Skills; however it has several significant flaws. It does not outline ethical approval or detail how the team's opinions were sought. It does not present any mitigation of cohesion from other team members which is a risk when conducting a study using a focus group. Furthermore, the doctors in the team are often the highest-ranking Officers; therefore, the rank gradient may influence the responses (Bernthal, 2015). Several details are missing from the qualitative analysis. Firstly, data demographics from the sample were not presented. Secondly, it is not known if the participants were aware of the study's aims or if this was withheld. Without this information, it is impossible to consider the author's main qualitative findings as credible or comparable to military pre-hospital care. Given the lack of rigour in reporting the methods used to extract the team's opinion post-mission, it could suggest bias. Regarding the physician-only interventions, it is unclear how these were determined; there is no reference to substantiate which skills are "physician-only". Therefore, it could be suggested that the skills selected are of the author's opinion and suggestive of bias. The study does not demonstrate an appropriate level of rigour to make sound conclusions or recommendations. However, it was included in the literature review because the data outlining the technical skills and improved patient outcome associated with advancement in training is comparative to the US studies Mabry et al., (2012) and Maddry et al., (2016). In addition, it is the first paper that has attempted to gather Non-Technical Skills data from MERT.

A subsequent UK literature review of five articles was conducted in 2018 by Sharp et al, which aimed to consider evidence concerning the Defence PHEC levels (Figure 1.2). This evidence was used to compile a matrix to assist with the definition of the PHEC levels and propose the technical skills for each of the Defence PHEC levels. PHEC level 6 skills included Advanced Life Support (ALS), Ketamine assisted procedures, use of supraglottic airways in cardiac or respiratory arrest and administration of freeze-dried plasma via a patient group directive or by using a prescription (Sharpe et al., 2018). The paper concluded that a systems approach would be advantageous for the operational patient care pathway, thereby professionalising the PHEC levels with specific training and equipment. The authors considered that 'higher levels of care from specialist teams, systems with governance, training, leads to better patient outcomes. These examples of the clinical components for PHEC level 6, although not fully defined, were incorporated within the Delphi study for this PhD (see chapter 6). Despite the lack of the competencies provided for each of the PHEC levels, Sharpe et al. (2018) demonstrate that there is a clear difference between levels 5 and 6, and this is in the use of sedation. In addition, it is further emphasised that PHEA is specifically excluded from the other levels, as this is considered a level 7-8 only intervention.

In a civilian-based study, Von Vopelius-Feldt et al. (2013) comparative study of competencies found that the CCP cohort had 441 competencies compared to paramedics who had 389. This equates to CCPs having 52 advanced competencies compared to paramedics. The CCP competencies were categorised into different clinical skills which included anaesthetic induction and maintenance, sedation, advanced cardiovascular skills and critical invasive interventions. Physicians had identified a total of 449 competencies,

only 8 more than CCPs. When the skills were compared, CCPs were shown to have the same competencies as the physicians except for PHEA, fascia iliaca block, thoracotomy and perimortem caesarean section. These latter procedures are considered physician-only interventions.

The paper does not outline how many presentations require the above specialist competencies, and neither does it measure endpoints following delivery of the interventions, for example, patient outcome and mortality. Furthermore, UK CCPs do not currently have a national curriculum; therefore, the additional advanced practice training they receive is delivered from local standard operating procedures (SOP) and cannot be considered standardised for CCPs across the UK. It is important to note, as the study is from a single centre, it is likely that CCPs from other areas may have different SOPs, resulting in potential variations in regard to scopes of practice, which draws into question the generalisability of the findings. However, other limitations are acknowledged within the study, such as the possibility of subjectivity in regard to data collection. It was not possible to measure Non-Technical Skills, such as communication or leadership, within the design of the study. Furthermore, the methodology did not include an investigation into performance during the delivery of these competencies. Despite the limitations, the paper does open the narrative towards describing which advanced skills could be considered PHEC level 6.

Performance of Pre-Hospital Teams and Impact on Patient Care

Continuous improvement is a vital part of pre-hospital care to ensure quality in its delivery and approach. For both civilian and military pre-hospital care, measuring quality helps to improve training by ensuring that it is tailored to preparing pre-hospital personnel for

different types of injury mechanisms and clinical presentations (Smith et al., 2007,

Simpson et al., 2012, Lairet et al., 2019). Military PHEC differs from civilian clinical

presentations (Chapter 1), and the most common mechanism of injury cited from the

papers was from a blast (Mabry et al., 2012, Apodaca et al., 2013, Reed and Bourn, 2018,

Sharpe et al., 2018, Galvagno et al., 2018, Lairet et al., 2019). Other injuries included

gunshot wounds (GSW) and penetrating mechanisms (fragmentation from blasts). Five

papers were identified that were relevant in investigating performance in military pre-

hospital care capabilities. These included three US and two UK studies focusing on the

performance of medevac providers (Morrison et al., 2013, Apodaca et al., 2013, Galvagno

et al., 2018, Lairet et al., 2019) which were explored to understand which elements of pre-

hospital care delivery are related to better patient outcomes.

Performance was related to team composition, skills and timings in pre-hospital care.

Apodaca et al. (2013) reviewed the performance of medevac capabilities to understand the

types of injuries evacuated, as well as comparing predicted mortality with observed deaths

and unexpected survivors for each of the three deployed medevac teams in Afghanistan.

Predicted mortality was measured using the Trauma and Injury Severity Score (TRISS).

TRISS was included as, unlike ISS, can be used to predict the probability of survival. A

total of 975 records of surviving patients from Afghanistan between 2009-2011 were

reviewed and were categorised using ISS across each of the medevac assets. The

patients with a higher ISS were predominantly transported by MERT, followed by Pedro

(Pedro is the title of the US paramedic-led medevac capability). Blast mechanism of injury

accounted for the highest number of presentations. The third medevac asset, Dustoff (US

EMT-led asset), was not included in the secondary analysis of mortality as the majority of

their patients were not severely injured and had a lower ISS, rendering the analysis of mortality unrealistic. Comparison of overall patients' mortality between Pedro and MERT was similar, with a 0.4% difference (4.6% vs 4.2% (p=0.967)) in low or high ISS groups. In terms of predicted TRISS data, MERT performed better, with a lower-than-expected mortality score, seen in ISS 20-29 patients. Pedro's score was 16.2% versus MERT's 4.2%. MERT was associated with greater survivability, likely linked to the additional skills (PHEA, blood transfusion), making it an advanced asset compared to Pedro.

However, despite the additional skills, extra personnel, a larger airframe and advanced medical capabilities, Pedro performed well in comparison to the overall crude mortality data. Due to the paper's methodology, it could not record en-route deaths or deaths declared before evacuation. Therefore, the mortality data may not be representative of the total deaths. The paper recognised this as a limitation but justified the decision as it was felt it could introduce bias in terms of MERT having a high number of mortality. For example, due to additional capabilities onboard MERT, it was routinely tasked to higher acuity patients. Therefore, it was likely to have a higher mortality rate as the patients would be more likely to be at the upper end of the ISS. In addition, Pedro and Dustoff's non-medical team cannot declare death in flight due to legal reasons; therefore, their en-route figures would have been zero. Despite these limitations, Apodaca study offers relevant findings that concur with other studies included in this review.

Collectively, papers noted that an advancement in pre-hospital skill-mix has associated survivability (Morrison et al., 2013, Apodaca et al., 2013, Maddry et al., 2016). It is recognised from Apodaca study, that MERT, with the addition of a physician, offers greater outcomes for patients with amputations or poly-trauma severely injured patients. In

contrast to Pedro, a paramedic-led asset provides the same outcomes for mild, moderate and catastrophic injured patients when compared to MERT.

Contextually, severely injured presentations make up a small minority of patients in Apodaca et al., (2013) study. Overall, the data presents a mean ISS of 16 for the 975 patients in the sample. This suggests that intelligent tasking of a MERT should be considered using the Patient Evacuation Coordination Cell (PECC) for the higher acuity patients to ensure this highly skilled capability is tasked to patients who will benefit most from their advanced interventions (Bricknell and Nadin, 2017). The additional advanced capabilities that Pedro has is undoubtedly superior in comparison to Dustoff, inclusive of advanced resuscitation, airway management and blood transfusion. It would seem Pedro was able to provide a good standard of capability for the vast majority of patients included in this study (Apodaca et al., 2013).

A similar study by Morrison et al (2013) compared US paramedic or medic provider assets known as conventional military retrieval (CMR) (Dustoff and Pedro) with the UK MERT, consultant-led service, referred to in the paper as an advanced military retrieval (AMR) asset. A statistical difference in mortality was reported for patients who scored between ISS 16 and 49, which accounted for 33.5% of patients; in comparison to the CMR capability, the statistical analysis demonstrated a risk ratio 0.63. For those patients with an ISS < 16 and over 50 there was no statistical difference observed between the two assets. The low ISS group (1-15) accounted for 61% of the patients presenting similar results to the previous paper by Apodaca (2013). Indeed, ISS subset analysis further supports the theory that the ADV capability should be intelligently tasked to the minority of patients with clinical presentations that would benefit most from this capability.

Despite there being no difference in mortality for the high ISS group (50-75), the AMR team showed a reduced timeline from the point of injury to the operating table. From the AMR cohort, technical interventions performed on the medium ISS (16-50) and high ISS (51-75) were categorised as: airway interventions, chest decompression and transfusion of blood products. The advanced interventions for combat casualties align with positive patient outcomes and corroborate the findings of other studies included in the review (Maddry et al., 2016, Holland et al., 2013, Calderbank et al., 2011, Apodaca et al., 2013). Of significance is the mortality data noted for over half of the patients with ISS <16, the CMR assets perform the same as AMR. For ISS >75, neither the AMR or CMR made any statistical difference in patient care, possibly suggesting that the patients were too severely injured to respond to any level of clinical intervention. Therefore, no level of medevac capability would have reduced their risk of dying. The paper suggests patients with an ISS 16-50 where advanced skills and additional capability made a statistical difference, both in mortality and time to surgery. Morrisons study concluded that an advanced physician-led medevac team positively impacts mortality for severely injured patients that are deemed survivable. Arguably, it could have been a combination of extra team members forming an advanced team, together with their additional skills and including a physician providing additional critical interventions such as PHEA, that collectively made the difference.

In 2018, Galvagno et al. conducted a retrospective study of the medevac assets staffed with APs from either a paramedic or nurse background. The data obtained via the US JTTR prospective database captured a total of 1,008 patients inclusive of military personnel and civilians. Medevac records were analysed to review interventions and outcome data, and a process improvement approach was adopted. The data were

assessed against 9 KPIs which comprised: airway, hypoxemia and blood transfusion management, interventions for hypothermia, analgesia, temperature control and care of traumatically injured patients. These KPIs were agreed upon following a modified Delphi approach with medevac experts. The ISS or mechanism was not included in the breakdown of hypotensive patients. The highest mechanism of injury was GSWs, followed by blast mechanisms. From a subset of 1008 patients, 403 outcome data were reviewed, the median ISS was 6 (maximum was 75), blast accounted for 43.2% followed by GSW 19.4%, these data included 10 deaths. Airway management training has been highlighted as a requirement following 7% of patients having SpO_2 <90% and 13% having missing documentation related to their intervention of hypoxic symptoms. The paper suggests, which is in agreement with the findings from this review, that advancement in pre-hospital training improves patient outcomes.

A subsequent paper from a military background undertook a prospective study using an observation method in Afghanistan (Lairet et al., 2019). Data were collated between Nov 2009 and Mar 2014 and the paper was published in 2019. Despite the delay in publication, the paper offers contextual findings for this review. The main aim of the study was to use descriptive data relating to pre-hospital interventions performed, any missed interventions and procedures that were undertaken incorrectly. A research team was sent to nine US military hospitals in Afghanistan to record the data on the patient's arrival. Interventions were reviewed to assess if they were performed correctly or were required. The data collection used has an inherent associated risk of bias due to the subjective nature in the way in which it was collected. As a result, the paper does not offer any detail regarding the inter-rater reliability of this selected method. During the data collection

phase, it does not focus on the assessment of performance, levels of training, patient outcome or transportation method.

However, from the 2,106 patients, again the most common mechanism of injury was blast (57%), followed by penetrating injury (29%). Vascular access and haemorrhage control were considered the most frequently performed skills, in contrast to airway and chest interventions, which were considered in the minority. The paper noted a direct association of incorrectly performed interventions in this minority group. The study hypothesised that these incorrectly performed interventions could be a result of reduced clinical exposure and practice in this area. It is not clear how the authors reached these conclusions. From the commonly performed procedures; haemorrhage control and vascular access, the breakdown for individual skills from these groups define interventions that are not considered outside the realms of a PHEC level 5 provider. Chest and airway interventions were in the minority and represented areas of incorrect practice from this group. Skills included chest tube thoracostomy and endotracheal intubation; these are currently beyond the training of a PHEC level 5 provider, suggesting level 6,7 & 8 interventions. In terms of incorrect or missed procedures, the paper notes a strong correlation of incidences when providers did not receive frequent clinical exposure. It is suggested that a robust educational programme to focus on areas of skill fade is considered vital to improve performance.

The final opinion paper by Thompson et al., (2022) aimed to define the capabilities of UK military PHEC and was based on a focus group with selected SMEs, four Defence Consultant Advisors for PHEC from each service, alongside the Defence Advisor for paramedics and emergency nursing. The aim was to update the PHEC-level definitions

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and requirements for clinical practice and define the term "MERT". The paper concluded

that MERT should be for a level 8 deployed team. Any PHEC capability below this

standard would be termed "medevac". This would replace the "MERT standard" and

"enhanced", mentioned as doctrinal definitions in chapter 1. In regard to PHEC level 6, it

remained the same as the previously accepted definition; however, individuals must also

meet the PHEC level 6 competencies. These competencies were not defined.

In the absence of military competencies UK civilian PHEC practitioners of all levels utilise

the Faculty of Pre-Hospital Care (FPHC) curriculum (FPHC, 2017), as discussed in

Chapter 1. For military PHEC levels 7-8, this is already being adopted for their sub-

specialised PHEM training. This training programme outlines the required knowledge,

skills and requirements for PHEC providers against the civilian FPHC levels outlined in

table 1.1. The curriculum covers a wide range of PHEC topics including assessments,

clinical conditions, medical and trauma, scene management, communication, and

environmental working. These topics are achieved through the assessment of the

following competencies (see Table 3.6 FPHC Competencies). The competencies of the

FPHC are split into sections; safety (n=6), scene management (n=8), catastrophic

bleeding (n=6), airway (n=13), spinal (n=2), breathing (n= 19), circulation (n=22), disability

(n=9), exposure (n=5), casualty handling (n=7), patient specialities (n= 44) and medical

presentations (n=48). Advanced skills are included under the heading of additional skills

for advanced pre-hospital practitioners (n=4) (FPHC, 2017). The FPHC curriculum

provides a standard of UK PHEC practice that could be potentially utilised by the DMS to

outline PHEC level 6 practice. The competencies outlined in the FPHC curriculum are

integral to the methodology and implementation of this PhD study.

Table 3.6 FPHC Competencies

Skills
Safety
Wear correct PPE for incident
Demonstrate understanding of scene safety
Perform dynamic risk assessment of scene
Consider casualty safety
Perform dynamic risk assessment of casualties
Communicate effectively with Emergency Services
Scene Management
Basic knowledge of the capabilities of different Emergency Services Personnel Ability to use appropriate radio communications
Awareness of triage
Competence in triage sieve
Competence in triage sort & management skills for multiple casualties
Ability to make decisions on casualty dispersement
Ability to incident command
Demonstrate forensic awareness
Catastrophic Bleed
Recognise life-threatening haemorrhage
Effectively manage catastrophic limb bleed
Effectively manage catastrophic junctional bleed
Able to apply indirect pressure
Competent application of tourniquet
Competent in use of haemostatic / packing
Spinal
Appreciate MOI high risk for spinal injury
Appropriate C-spine management
Airway
Put head in neutral alignment
Inspect and clear airway
Head tilt chin lift + neutral alignment
Jaw thrust
Postural airway management
Use of suction
Size and insert nasopharyngeal airway
Size and Insert oropharyngeal airway
Size and insert supraglottic airway device
Perform surgical airway
Perform needle cricothyroidotomy in children
Competent to RSI assistant
Endotracheal tube insertion
Breathing
Identify if patient is breathing normally
Correctly assess breathing rate
depth and quality Perform basic chest examination Rise and Fall
Identify life-threatening chest conditions
Finger thoracostomy
Needle decompression
Chest drain insertion
Management of sucking chest wound
Recognition of a sucking chest wound

Application & management of occlusive chest dressings
Recognition of immediately life-threatening flail chest
Competent management of massive haemothorax
Understanding of enviro limitations of pulse oximetry
use if appropriate Ability to monitor & react to end tidal CO2
Safely configure an Oxygen system for use Free-flow oxygen (+ correct mask choice)
Nebulisation
Nebulisation with T-piece
Oxygen delivery via Bag-valve-mask
Oxygen delivery via mechanical ventilator
Circulation
Assess presence of circulation Measure pulse rate and rhythm
Assess blood pressure
Measure capillary refill time
Assessment of heart sounds
Use of pre-hospital imaging techniques Assessment of blood loss
Apply direct pressure
Apply indirect pressure
Wound packing
Wound closure
Splintage as a haemorrhage control
method Use of haemostatic agents
Use of appropriate medication for haemorrhage control
Application of pelvic splintage
Use of traction devices
Attain intravascular access (IV/IO)
Administration of appropriate IV fluids
Ability to administer blood products
Application of appropriate wound dressings
Ability to perform a twelve lead ECG
Ability to interpret a twelve lead ECG
Disability
Assess AVPU
Use Glasgow Coma Score
Assess PERL
Identify indicators of underlying head injury
Assessment of traumatic brain injury
Assess Blood Glucose level with a glucometer
Assess neurovascular status
Perform a more indepth neurological examination
Perform a FASTest (acute stroke)
Exposure
Differentiate Cold from Hypothermia
Differentiate heat exhaustion from Heat stroke
Recognise possibility of and prevent hypothermia
Recognise possibility of and prevent hyperthermia
Assessment, treatment and casualty handling of patients exposed to extremes of temperature in an austere environment.
Casualty Handling
Appropriate packaging of patient for evacuation
Assist with transfer of patient
Manage transfer of patient to appropriate evacuation device
Ability to medically assist in safe extrication of a patient in an operational environment

Ability to medically manage the safe extrication of a patient in an operational environment
Ability to understand and make disposition decision
Provide appropriate clinical handover to next echelon of care
Obstetrics
Ability to carry out cABCDE appropriately in a pregnant woman
Manage the complications of pregnancy
Management of pregnancy-related bleeding
Manage the common complications of delivery
Manage a normal delivery
Emergency Caesarean Section
Aware of the complications of rescue packaging and transport
Paediatrics
Ability to carry-out Basic Life Support protocols on a child and infant
Ability to provide basic resuscitation to a neonate
Knowledge of normal anatomy & physiology of a child
Manage common childhood emergencies
Refer and manage safeguarding issue
Knowledge of the differences in triage parameters for children of different ages
Mental Health
Awareness of simple consent issues
Awareness of simple mental health issues
Be able to perform a competency assessment
Be able to understand and apply the current Mental Health Act
Be able to understand and apply the current Mental Capacity Act
Ability to perform a mental capacity assessment
Ability to administer appropriate medication as necessary
Understand the law and make decisions regarding section 136 (or equivalent) and 'Place of Safety'
Thermal Injury
Ability to assess the extent and severity of thermal injury
Recognise when specialist input is needed
Recognise public health risks of chemical agents and carry out appropriate actions
Understand and apply the HAZMAT code
Apply appropriate treatment and burns dressings
Competence in managing the severe complications of burns (i.e. escharotomy)
Musculoskeletal injuries
Ability to perform basic joint examinations
Recognition of likely fracture
Identification of dislocation
Reduction of dislocations where appropriate
Reduction of fractures where appropriate
Use of appropriate analgesia
Recognition & appropriate initial treatment of soft tissue injury
Drowning
Recognition and management of unconscious drowned patient
Recognition and management of conscious drowned patient
Recognition of late complications of drowning
Death
Identification of life extinct in exceptional circumstances
Trauma Interventions and ultrasound
Rapid Sequence Induction (RSI)

Thoracotomy
eFAST (Extended Focused Assessment with Sonography for Trauma)
Administration inotropes
Administration of paralysis post cardiac arrest in ROSC
Procedural sedation using ketamine
Medical (Ability to definitively treat, discharge and manage)
Airway obstruction / choking / stridor
Acute breathlessness
Cardiac arrest
peri-arrest Hypotension and shock
Palpitation and cardiac arrhythmia
Acute headache
Acute abdominal / loin / scrotal pain
Acute vomiting
Acute confusional state
Collapse
The unconscious patient
Intoxication and poisoning
The fitting patient
Acute allergic reaction
Acute non-traumatic neck / back pain x Sudden weakness / paralysis / abnormal sensation
Acute visual disturbance / red eye
Acute febrile illness
Acute gastrointestinal haemorrhage
Acute limb pain and/or swelling
Acute rash
Acute haemoptysis
Bites, strings and envenomation
Clinical recognition and management of diabetic hypoglycemia
Recognition and management of diabetic hyperglycaemia
Acute epistaxis
Recognition and immediate management of Stroke/TIA
Headache management
Recognition of main causes of chest pain
Management/ referral for main causes of chest pain - Myocardial Infarction
Myocardial Infarction drug management, including analgesia
Direct referral to PCI for STEMI patients
12 lead ECG completion/interpretation
Recognition of non-traumatic limb swelling
Recognition of Allergy/Anaphylaxis/Bites and stings IM adrenaline for Anaphylaxis
Recognition of common Toxicity and Poisoning Management for common toxins/poison
Recognition of Meningitis in adults and children
Management of Meningitis in adults and children IV/IM/IO Antibiotics for Meningitis
Recognition/Management of Sepsis
Recognition/management of hypothermia
Recognition/management of exposure/cold injuries
Recognition/management of heat exhaustion
Recognition/management of heat illness
Cardiac pacing
Use and administration of CPAP ventilation

A further recommendation from Thompsons paper suggested that PHEC level 6 providers from a non-medical background were required to work in an AP role such as a CCP. With an additional suggestion of 2 years clinical time post level 5 competence for paramedics and 4 years for nurses. It is unclear why there is a disparity between the two roles. In addition, the clinical outputs regarding the level of autonomy and scope of practice of a CCP vary depending on the service.

The paper is based on the opinion of a panel of six personnel, with four out of six at consultant level and holding a higher military rank. The lack of rigour and likely bias generated from a focus group cannot be considered as evidence. A Delphi study would have aided in avoiding some of these issues. In addition, it should be noted that the recommendations have not been brought into Defence Policy for PHEC. The paper recommends that their findings will inform doctrine.

3.6 Gaps in the research evidence base

The literature review has revealed several gaps in the research related to this topic. Firstly, there is a lack of high-quality evidence in regards to military AP practice, as research originated from retrospective studies, opinion or narrative literature reviews. The retrospective studies used data from Afghanistan, offering measurable findings on the impact of different roles against patient outcomes. However, these designs have limitations in terms of selection bias, missing data, lack of statistical analysis, lack of RCTs, or prospective trials. Sharpe et al. (2018) literature review has identified new knowledge and thinking to re-design the utility of the PHEC levels for deployed pre-hospital care.

It was noted that there was a lack of research published after 2013 is a further significant gap in the evidence base, and this is likely to be attributed to the drawdown of operations in Afghanistan in 2014. Since Afghanistan, there have not been any other combat operations of this size, which has resulted in an overall reduction of deployed pre-hospital assets, and in turn, reduced research in this area. With limited papers published, there are gaps in the literature relating to the evolution of pre-hospital skills and roles for future pre-hospital operations. In addition, it should be noted that there is a varied contextual application of the AP roles both internationally and in the civilian setting. In terms of variabilities of role definition, job titles, training and scopes of practice will undoubtedly impact the applicability and quality of the evidence reviewed.

Nonetheless, the literature provides some evidence that advanced training and skills are associated with improved patient outcomes in some settings (Mabry et al., 2012, Davis et al., 2007, von Vopelius-Feldt and Benger, 2013, Sharpe et al., 2018).

3.7 Conclusions

This narrative review has reviewed the available literature on military APs. Firstly, it has identified the following advanced skills associated with PHEC Level 6 practice, which included ALS, sedation, and supraglottic airways, with a further emphasis on the need for a combination of advanced training consolidated in relevant clinical practice. Notably, PHEA was identified as a military PHEC level 7-8 intervention. This chapter lays the groundwork for the Delphi study by examining the skills outlined by the association with PHEC AP and FPHC competencies. The skills identified and reviewed serve as the

foundational basis for the subsequent Delphi study, guiding the exploration and consensus-building process among experts in the field.

In addition, the review highlighted the importance of collecting clinical information during ground triage to identify patients who require an advanced level of care. This suggested that the deployment of advanced medevac providers, particularly at level 6 and beyond, should be specifically tasked to patients who will benefit most from their skills.

From the literature, the theme of advanced PHEC skills beyond PHEC level 5 had been associated with improved patient outcomes. Studies highlighted that additional skills acquired through advanced training have a positive influence on reducing patient mortality, particularly in a subset of trauma patients with ISS 16-50. This was achieved through training supplemented with continuous professional development (CPD) to ensure that additional skills acquired can effectively deliver positive patient outcomes. The conclusion drawn from this finding is that if military APs are trained to this level, they require training supplemented by continuous clinical exposure (CCE) to acquire and avoid skill fade.

Despite the limitations of the narrative review, notably the lack of high-quality evidence, which did not include prospective, mixed methods or Delphi designs, this review is a first step in understanding the current evidence in relation to AP roles and skills in a military PHEC environment. Based on the review findings, there is a clear need for this PhD study to review and define the current PHEC levels, with a focus on defining the clinical components required for level 6. The information from the narrative review was used to inform the study design, which employed a Delphi method to seek consensus on military PHEC level 6 practice in Chapter 6. The Delphi study aimed to gain a better understanding of skill sets and associated roles that align with the requirements of

deployed PHEC. Furthermore, the review findings were used to design the semi-structured interview question set for Phase 2 of the study, allowing for further exploration of the early themes identified in the review. The next chapter outlines the methodology and research design (chapter 4), and chapter 5 describes the methods for the study.

Chapter 4. Methodology and Research Design

4.1 Introduction

This chapter describes the research design before moving onto chapter 5 which outlines the research methods for each phase. The research investigates the skills associated with level 6 PHEC, explores current experiences of military APs and investigates other pre-hospital clinicians' experiences of working with APs in this field. By investigating these aspects, the research aims to gain a comprehensive understanding of the potential value and challenges associated with implementing military APs for PHEC operations. Using a sequential mixed methods design, this research is comprised of two distinct but related phases which specifically address the following research questions:

RQ 1. What clinical and non-clinical skills are required for the performance of L6 pre-hospital emergency care in military settings?

RQ 2. What work activities do military APs currently perform in practice?

RQ 3. What are military pre-hospital personnel's perceptions and experiences of the AP role as it currently operates, and what are their views on its future value in military settings?

The chapter will outline an overview of the study design and my ontological position, which frames and provides context for the methodological approach.

4.2 Overview of the study design

Overview of the study phases

Phase 1 of this research used a Delphi method to investigate clinical and non-clinical skills for level 6 practice to explore research question 1. This phase aimed to identify an agreed list of PHEC level 6 care requirements. As described in chapter 1, although the PHEC levels have been approved and endorsed by the DMS, clinical skills were not formally aligned to each level. It is recommended that level 6 practitioners should be competent in safe sedation, blood transfusion and rescue airway devices (Sharpe et al., 2018). However, this list is considered not exhaustive of all the necessary competencies for level 6 practice when compared to the civilian and international militaries PHEC APs. The literature review (chapter 3) identified that the civilian CCP role (which most closely maps to level 6 care) has a range of additional skills and capabilities. To explore the full list of competencies required for each of the levels, an iterative Delphi method was administered to 24 Defence subject matter experts. The Delphi method process is detailed in section 4.5.

Phase 2 was designed to address research questions 2 & 3, using semi-structured interviews with current military pre-hospital APs with a MERT operational background. The non-AP interviews were conducted with members of the subspecialty board for PHEC who work or come into contact with pre-hospital APs in NHS settings. The interviews were used to explore from the multi-disciplinary team on their experiences of the APs' role in terms of role understanding, expectations and perceptions. The interviews also explored conflicting views about level 6 competencies and requirements that arose in the Delphi study. This phase is explained further in section 4.6.

Themes from the interviews, findings and results from the Delphi study were integrated

and triangulated in the analysis of the mixed methods data (section 4.3) to provide a

'complete picture' and answer the research questions. Figure 4.1 presents a flow diagram

that illustrates how the study components fit together to address the research questions.

Figure 4.1 Flow diagram of the research design
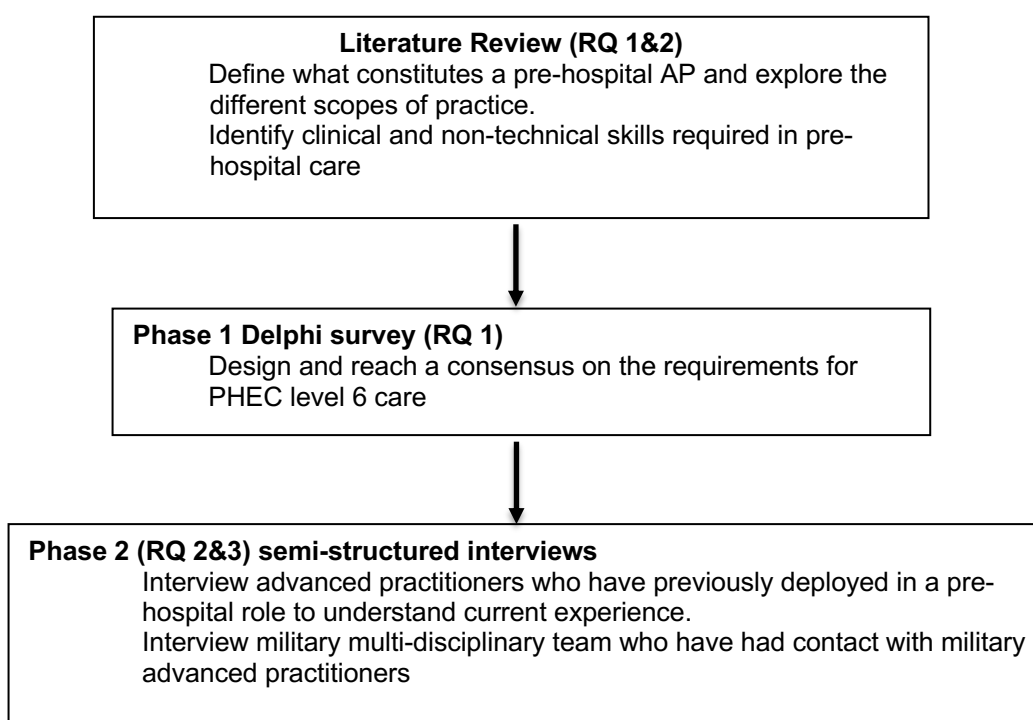
Overview of the study setting and the Sample

The study sample for the Delphi and non-AP interviews were drawn from the "Defence

Sub-Specialist Pre-Hospital Board". The sub-speciality PHEC board setting was chosen

as the board members are pre-selected by the Defence Consultant Advisor for PHEC, as

they are considered subject matter experts (SMEs) in pre-hospital care. The board

consisted of 26 members, and included Defence Consultant Advisors, Defence

Professors, Defence Specialist Advisors (paramedics and EC nurses), RAF Consultant

Advisors for PHEC and MERT SMEs from Tactical Medical Wing. The board provided a

cross-section of members representing clinical levels 5-8 (L8 =8, L7 =4, L6 =4, L5 =8).

This speciality board within the DMS provides advice and guidance on Defence PHEC

issues. In addition, specifically for the AP interviews, military APs with a PHEC

background from either the reservist or regular armed forces were sampled.

4.3 Mixed methods research design

A mixed methods design was chosen for this study to address the complexity of the

research questions using a combination of quantitative and qualitative research. When

employing mixed methods, data is merged and connected providing an overall picture to

answer the question(s) (Creswell, 2014). Mixed methods are often chosen when one

method is deemed inadequate to answer the question in isolation (Creswell and Clark,

2017, Creswell, 2014). It lends itself to research in healthcare as the questions that arise

are often considered complex, where one design may not provide the answer to the

problem (O'Cathain et al., 2007).

Employing mixed methods ensures a combination of methods to comprehensively address

the question (Johnson and Onwuegbuzie, 2004, O'Cathain et al., 2007). When the data is

mixed, it provides new meanings that inform the phases of the study. In addition, mixed

methods support studies with a theoretical framework or the researcher's contextual

understanding of the problem (Creswell and Clark, 2017, Creswell, 2014). The specialist

subject matter knowledge that a researcher brings to the subject facilitates designing the

phases to ensure all areas are covered to address the research problem holistically.

There are several mixed-methods combinations using concurrent or sequential designs

(table 4.1). When choosing the method, it's important to note that one method can have

dominance over the other, or both quantitative and qualitative can have equal priority in

the study (Ghiara, 2020, Creswell and Clark, 2017, Creswell, 2014). For this study, a

qualitative approach took primacy as it generated the most amount of rich data for the

study. However, the choice is based on what is required to ensure the question is

answered adequately (Johnson and Onwuegbuzie, 2004). In addition, when using mixed

methods, the combination of methods must be chosen for what is the best fit for the study.

This takes priority over personal preference. This ensures an impartial and

comprehensive approach when addressing the research questions (Johnson and

Onwuegbuzie, 2004).

Table 4.1 Mixed methods approach

Convergent parallel or concurrent design	Exploratory sequential design	Explanatory sequential design
Collect Quantitative and Qualitative data separately	Collect qualitative data first, then collect quantitative. The first phase informs the second.	Collect quantitative data first, then collect qualitative data. The first phase informs the second.
Merge both results at the end.	Final analysis	Final analysis

Some examples of mixing qualitative and quantitative methods include convergent parallel

or concurrent designs. The convergent approach involves collecting data separately and

then merging it at the end in the final analysis of the mixed methods. The main aim of this

approach is to collect the same data which complements the topic. Although this is an

efficient method, it requires different samples, and this can lead to challenges during the merging stage (Creswell, 2014).

Another approach includes an exploratory sequential design that requires qualitative data collection first, followed by quantitative and a final analysis to triangulate the results. This approach has two distinct phases that inform each design phase as the study progresses.

Lastly is the explanatory sequential design, which involves collecting quantitative data first, which is interpreted and informs the qualitative phase, with final analysis, triangulation phase and summarising (Creswell, 2014).

An explanatory sequential design was chosen for this study which begins with a quantitative approach, which builds from the findings within the literature review. The Delphi method was required to establish consensus for the PHEC level 6 skills and initial themes. Following the quantitative analysis, the findings informed the qualitative phase, which built from the initial results. The interviews enabled a better understanding of the Delphi, which was explored in more depth in Phase 2.

The explanatory method is used when the researcher has a good grasp of the concepts and variables surrounding the study (Creswell, 2014). In addition, this method can use the same participants for the quantitative and qualitative phases of the study. This enables a deeper understanding and provides a level of consistency from the sample used. Furthermore, the participants can be approached to explore additional themes generated from the phases. The non-AP group was sampled from the Delphi study PHEC SMEs. Therefore Phase 2 broadly used the same participants.

Although the phases of this study are distinct, its emergent design facilitates both explanatory and exploratory approaches, and each phase is informed by the findings

sequentially. Some of the limitations of these approaches are the time it takes to implement both phases. This is because the first phase requires data analysis to inform the design of the next phase. In addition, it requires a degree of flexibility to adapt the design to ensure its fit for purpose and is tailored to the study aims. This could have implications for ethical and practical considerations, as the evolution of the study may deviate from the original ethical clearances and require submission for further ethical clearances (Creswell, 2014, Creswell and Clark, 2017). However, this was not an issue for this study. Ethical considerations for both phases are explored in further detail in section 5.4. Lastly, the sample needs to be the same for both phases for an explanatory mixed-method approach. For this study, this was deemed not an issue as the setting recruited pre-hospital subspecialty board members and therefore remained bounded throughout the mixed-methods approach.

Following the data collection, the final analysis is sometimes known as triangulation. This involves merging the results to compare and contrast findings to understand if they converge and tell the same story. In triangulation, this aims to provide a deeper insight, reviewing contradiction or divergence assessed against the research questions (O'Cathain et al., 2007). Regardless of whether there are discrepancies, the connections found within the data interpretation aim to provide a complete picture to ensure the research problem is fully addressed.

4.4 Ontological position

The literature suggests that there are three main paradigms which typically underpin mixed methods research. The paradigm choice is partly informed by the researcher's beliefs and stance about what constitutes truth and knowledge (Creswell and Tashakkori, 2007). Positivism and interpretivism are the two main paradigms in studying the social world (Ghiara, 2020), which can be distinct for mixed methods research depending on which approach is undertaken (Ghiara, 2020). Interpretivism typically underpins qualitative research. It is not governed by strict techniques required in scientific enquiry, moreover, it seeks the truth by researching a state of mind, organisational conditions, attitudes and opinions (Mays and Pope, 1995). For quantitative approaches, the researcher is required to be objectivist, avoiding interference that could infer bias. Quantitative research measures reality, analyses numerical data and looks for patterns. When adopting mixed methods research using both the interpretivism and positivism paradigms to underpin the different components of the study, the researcher is required to shift their view when moving through each phase. This is because each phase drives different questions (Mertens, 2012).

For this study, Phase 1 would be typically underpinned by positivism before shifting to interpretivist perspective in Phase 2. Mertens et al. (2012) argue that conducting mixed methods research using only one of the above-mentioned paradigms, in isolation, could be considered impractical (Johnson and Onwuegbuzie, 2004, Mertens, 2012). For example, adopting a pure interpretivist position would likely introduce bias during the quantitative phase, as a positivist considers talking to people is likely to skew the study in the quantitative stage (Mertens, 2012). Literature suggests that shifting from two contrasting

views is also unrealistic, leading to confusion in regard to which belief structure has been adopted (Mertens, 2012). Some researchers suggest that there is another worldview that is appropriate for mixed methods research (Mertens, 2012). This third approach, where the researcher chooses the same view for both quantitative and qualitative designs, is known as pragmatism (Creswell and Tashakkori, 2007). Pragmatism is considered more of a practical approach as it values both views of interpretivism and positivism paradigms, with an emphasis on empirical observation (Ghiara, 2020). It is flexible as it does not require a shift from one position to another. Pragmatism relies on the researcher's interpretation of the observation. Pragmatism was adopted for this study as it was considered a natural fit for the research question and my ontological position. Nonetheless, regardless of the approach, it's important to select the right paradigm that will answer the question, which does not necessarily mean adopting one stance (Ghiara, 2020). Research in healthcare is complex and mixed methods aim to address some of these challenges associated with research by using the right paradigm to ensure it answers the question and works for the study (Ghiara, 2020).

Before detailing the methods for each phase, it is essential to outline my ontological position and its implications for the study. Having considered various research paradigms, the method used for this PhD study aligns with a pragmatic position. My roles as an ACP and Military Officer facilitate experiencing the current issues associated with military APs. This insider perspective enables me to use a pragmatic approach to identify the broad concerns related to APs.

Reflexivity

Qualitative research, by its nature, is subjective (Mays and Pope, 2000). It has two main data collection methods, that of observation and interviews. These methods, although able to generate rich data, require some degree of subjectivity which in turn carries the risk of bias. To mitigate against bias, the researcher needs to be aware of their own beliefs and values and how they could impact the research (Mays and Pope, 2000). This is where reflexivity is required in qualitative research. The researcher needs to be transparent with their position. This is considered good practice in terms of conducting and judging the credibility and quality of qualitative research. Nonetheless, it is vital to ensure my assumptions and opinions do not unduly skew or add bias to the research. This involves questioning personal beliefs and judgements on the research, ensuring a transparent approach, taking an outsider perspective. Within chapter 1 section 1.7 at the start of this thesis and within chapter 9, presents the insider perspectives which has remained fundamental throughout the study to ensure the thesis is reflexive (Malterud, 2001).

4.5 Conclusion

Chapter four has outlined and explained the rationale for the methodology for the PhD research. The explanatory and sequential mixed methods design allows for a systematic and comprehensive approach to ensure the research questions are addressed.

The chapter presented the rationale underpinning the choice of a mixed methods design for the study. Mixed methods were chosen to enable the integration of both quantitative

and qualitative data, addressing the inherent complexity associated with healthcare

research of this nature. By combining different data collection methods, the study sought

to capture a comprehensive understanding of APs within military PHEC. Furthermore, the

chapter highlighted the ontological position, which is integral to shaping the overall

approach to the PhD. The ontological position refers to the researcher's beliefs about

reality and their role. Understanding and acknowledging their position is crucial, as it can

influence the choice of methods, interpretation of data, and the overall approach to the

research. The subsequent chapter outlines the specific methods used in each phase of

the research. It describes the data collection procedures, analysis techniques, and the

rationale behind selecting these methods.

Chapter 5: Phase 1 and 2 data collection methods

5.1 Introduction

Chapter 5 presents the methods for this PhD study, describing the Delphi study (Phase 1) and the qualitative interview methods (Phase 2). Each phase describes and explains the rationale for sampling, recruitment, data collection processes and analysis. Lastly, before summarising the methods, an overview of the ethical and consent considerations is presented. By presenting the methods for each phase, the chapter offers a comprehensive description of how the research was conducted and how the data were gathered to address the research questions.

5.2 Phase 1: Delphi study design

This phase aimed to identify an agreed list of requirements for each of the Defence PHEC levels. As mentioned previously, the clinical practice and non-technical skills have not been formally aligned for levels 5-6. The lack of definition for PHEC level 6 opens up the debate on who should be recognised at this level and what skills are required (Paxman et al., 2021). Specifically, if it should be a GP, paramedic or nurse. Without a clear definition of the technical and non-technical skills required at level 6, it is impossible to decide which role should deliver this capability. It is recommended that level 6 practitioners should be competent in safe sedation, blood transfusion and rescue airway devices. From the literature review conducted in chapter 3, there was some evidence that advanced training and skills are associated with improved patient outcomes in some settings (Mabry et al.,

2012, Davis et al., 2007, von Vopelius-Feldt and Benger, 2013, Sharpe et al., 2018). Skills considered above PHEC level 5 included blood transfusion, administration of intravenous fentanyl, ketamine, procedural sedation, administration of freeze-dried plasma, Advanced Life Support (ALS), use of supraglottic airways in cardiac or respiratory arrest, intubations, mechanical ventilation and intercostal drainage (Sharpe et al., 2018, Maddry et al., 2016, von Vopelius-Feldt and Benger, 2013, Calderbank et al., 2011). However, these civilian identified skills do not translate to current military practice; for example, blood transfusion, ALS, and supraglottic airways are currently undertaken by MERT level 5 practitioners. In terms of PHEM level 7-8, papers obtained in the review were consistent in considering PHEA, fascia iliaca block, thoracotomy, chest drain & thoracostomy, pronouncing life extinct and perimortem caesarean section, as physician-only interventions (von Vopelius-Feldt and Benger, 2013, Davis et al., 2007, Calderbank et al., 2011). From the research, UK military pre-hospital care above PHEC level 6 is performed by a Consultant who has sub-specialised in PHEM (Davis et al., 2007, Calderbank et al., 2011).

The military PHEC levels are broad, and their definition is based on job roles, not competencies. It is currently recommended that level 6 practitioners should be competent in the delivery of safe sedation, blood transfusion and rescue airway devices (Sharpe et al., 2018). This list is sparse compared to the advanced skills attributed to PHEC level 6 found in the literature review. Furthermore, it should be stressed that the finalised list of clinical requirements and non-technical skills such as clinical leadership, decision-making, human factors and team working has not been formally defined by the DMS or within the Joint Pre-Hospital Care Concept of Employment (CONEMP, 2015). To move forward to identify an agreed comprehensive list of requirements for PHEC level 6 practice, a Delphi study was utilised to seek consensus on the clinical and non-clinical requirements for

PHEC level 6 from a cohort of subject matter experts (SME) in Defence pre-hospital care. The results from the study were designed to inform Defence pre-hospital policy in regard to training and suggest roles that could perform the duties of a PHEC level 6 provider. In addition, the data gathered informed the focus on the interview phase of the study.

The Delphi technique, developed by the Rand Corporation in the 1950s (Okoli and Pawlowski, 2004), involves anonymised contributions from a panel of experts. Through multiple survey rounds, the purpose of the Delphi method is to progressively develop a consensus of an agreement to tackle a complex problem (Okoli and Pawlowski, 2004). A modified Delphi approach was undertaken for this study. The modified Delphi remains comparable to the classical Delphi in terms of the series of rounds to experts to achieve consensus and maintaining anonymity (de Meyrick, 2003, Custer et al., 1999, Avella, 2016). The main difference between the two methods is that the classical Delphi aims to gain consensus of opinion of a research problem using open-ended questions (de Meyrick, 2003). The modified Delphi, although honouring the key tenants of the Delphi design, seeks to gain consensus using a range of options such as using closed questionnaires, offering solutions to the research problem, panel discussions and interviews in an effort to resolve consensus. In contrast, in a classical Delphi design, the solutions to the research question are brought about through consensus achieved through the questionnaire rounds (de Meyrick, 2003). The modification for this study was to use the selected FPHC competencies, free text responses and exposing the candidates to the group's consensus in round 4. In addition, a selection of questions during Phase 2 were included to seek clarity on contentious items. One of the key advantages of using a modified approach is better engagement from the respondents. Seeking consensus on pre-selected material provides a focus and grounding on the research problem (Custer et al., 1999).

Whether using a classical or modified approach, there are conflicting views from the literature regarding what degree of agreement constitutes a 'consensus' and how to express it (Rowe and Wright, 1999, McKenna, 1994). Despite the variation in approaches, a percentage calculation is often used to indicate an acceptable level of consensus or agreement; this can range between 50-100% (McKenna, 1994, Williams and Webb, 1994, Niederberger and Spranger, 2020). Other forms of presenting consensus within the results section include Likert scales and units of central tendency (Niederberger and Spranger, 2020).

A threshold figure to fully judge consensus within the literature is not clear. However, before conducting a Delphi study, researchers must clearly articulate the method in which consensus will be assessed and agreed upon (Keeney et al., 2006). The classical Delphi method cites that the convergence of an item is between 70-80%, and this is considered acceptable (Avella, 2016, Hsu and Sandford, 2007, Chang et al., 2010). For this study, 70% was chosen as the threshold by which to judge consensus. To achieve 70% consensus, a Delphi study may have several iterations of questions. However, on average, 3-4 rounds are normally sufficient to achieve this level of consensus (Hsu and Sandford, 2007, Chang et al., 2010). One of the main advantages of Delphi studies is anonymity. This method was selected over other designs, such as brainstorming using a focus group, due to its unique ability to provide anonymity. This method ensures responses do not have any undue influence or peer pressure on participants, such as from key PHEC stakeholders or higher-ranking Officers (Hsu and Sandford, 2007). For example, higher ranking or people perceived to be experts can sway other people's opinions in a face-to-face setting. This would likely become an issue in a focus group. Mixing expertise in a face-to-face group can bring about the groupthink phenomenon

(Boateng, 2012, MacDougall and Baum, 1997). This refers to how biases from groupthink can result from the initial arguments given by the first speaker, especially if they are considered compelling within the group, can further skew the research as the discussion continues (Boateng, 2012, MacDougall and Baum, 1997). In addition, how people answer in person can impact responses, especially if a participant has a degree of charisma, status or dominance within the group. To further compound these issues, it is often the case that once an opinion has been expressed, it can be challenging to go back on it due to the risk of "losing face" in the group. These issues will likely be further exacerbated in the military due to its rank structure. The military is a hierarchical organisation, and the rank gradient risks coercion (Bernthal, 2015). High-ranking personnel can be perceived as more experienced and expert; therefore, they can move other people's opinions who are not holding the same level of rank. This would be an issue for the sample group chosen for this study, where a consultant is a Lieutenant Colonel, an equivalent of an OF 4 rank, and a paramedic is likely to be an OR 6 corresponding to a Sergeant. Although both may be considered experts in their medical roles, the rank gradient could influence the Sergeant's response in a face-to-face group from higher ranking doctors.

Lastly, an additional consideration is if the participants work together as colleagues, this further risks influence from their respective chain of command. The Delphi allows people to be influenced anonymously by ideas generated by participants, often in round 4. It allows participants freedom to weigh answers and provide independent opinions in a safe place. It harnesses expertise within a group without the introduction of bias. However, it cannot fully eradicate it as there is a chance that participants, especially in this field, may know each other and therefore could discuss their answers outside the study, potentially being swayed by another participant. This cannot be avoided, but it is important to note as

it may account for erroneous responses. Another advantage of a Delphi study is that it can provide solutions to complex and ambiguous research problems within a multi-disciplinary organisation (Avella, 2016). For example, for PHEC level 6 competencies, some examples of requirements such as blood and sedation administration, are listed as current competencies. However, these two requirements are sparse when compared to the civilian CCP (civilian equivalent to PHEC level 6) scopes of practice and the other 250 competencies outlined in the national curriculum of the FPHC. A further benefit is that the Delphi method is considered a low-cost option compared to face-to-face strategies such as interviews or focus groups where participants are required to take time out of their work to attend (Avella, 2016). In addition, the Delphi can be conducted virtually, which is advantageous for military participants who may be deployed worldwide.

Disadvantages of the Delphi study include questionnaire attrition rates due to the length of time it can take to obtain full consensus. However, in a review of Delphi approaches, the median response rate was 87% for the first round and 90% in the second round (Niederberger and Spranger, 2020). These encouraging findings seem to be attributed as a result of the participant's interest in the subject area. However, conversely, anonymity can provide less buy-in in terms of motivation, leading to rushed contributions to the rounds (Avella, 2016). These issues can be further compounded with additional rounds due to a lack of agreement. However, it can be mitigated by a selection of SMEs whose experience and views are founded on an enhanced knowledge of the subject area, thereby reducing indecision and leading to a lack of consensus. Delphi studies have resulted in criticism regarding validity (Powell, 2003, Williams and Webb, 1994). This is because the Delphi approach is based on expert opinion not scientific fact (Powell, 2003). To mitigate bias and indecisiveness, the researcher must select the right group of participants with the

right level of expertise to achieve the study aims and avoid indecision due to a lack of knowledge of the subject (Avella, 2016). The literature on Delphi studies notes that the rigour involved in the initial selection of participants is considered a significant factor in achieving success using the Delphi method and is outlined in the sample section (Hsu and Sandford, 2007, Okoli and Pawlowski, 2004).

Nonetheless, within the literature, the following should be considered to avoid failure when undertaking a Delphi approach (Mitroff and Turoff, 2002). Firstly, the introduction of bias is when the researcher imposes their views in the delivery of the questions by asking leading questions. Secondly, the introduction of a confirmatory bias by surmising that Delphi will entirely answer the research question. For example, choosing not to investigate conflicts or disagreements to fully grasp the issue around non-convergence. Thirdly, negligence caused by the researcher not properly outlining the details when presenting findings to the groups during iterations of the rounds leading to confusion. Lastly, not factoring in the time it takes to complete the rounds of the Delphi resulting in rushing the study by reducing the iterations.

Sample and Recruitment

Hsu et al. (2007) suggest that between 10 to 18 people is likely to provide a homogenous response to find a consensus (Okoli et al. 2004). However, the Delphi sample is not statistically powered; rather, its validity is dependent on the selection of appropriate SMEs (Okoli et al. 2004).

Purposive sampling is based on the researcher's knowledge of the study and the populace for recruitment. For purposive sampling when recruitment is based on expertise the

researcher has to set clear parameters, providing an inclusion and exclusion criteria.

Purposive sampling can be considered targeted and deliberately tailored towards the

research question (Campbell et al., 2020). For this study, expert sampling was used,

participants were chosen for their expertise in military pre-hospital care with an operational

PHEC background. Other types of purposive sampling include; homogenous, critical case,

maximum variation and total population sampling. In addition, purposive sampling is

considered cost and time-effective (Campbell et al., 2020).

Disadvantages are that it can introduce bias, although not directly, and the pre-judgements

required to select participants can put the sample at risk of selection bias (Campbell et al.,

2020). It could result in a lack of diversity across the sample, as the researcher has

effectively "cherry-picked" the sample. This could throw doubt into the findings as

selection bias can skew the data and cause errors resulting in a loss of confidence in the

research findings. Conversely, purposive sampling can ensure "maximum diversity" as it

ensures participants are chosen who possess a wide range of different experiences and

characteristics. Therefore, the sample should provide depth to the study (Campbell et al.,

2020). To mitigate selection bias, board members are already pre-selected by the DCA to

represent their clinical area in pre-hospital care and the corresponding level. Therefore,

this sample was considered the best for identifying subject matter experts (SME) on

military PHEC. The sample for this study was drawn from advisors representing different

expertise and professional backgrounds including Defence Consultant Advisors, Military

Professors, Defence Specialist Advisors (paramedics and emergency medicine) and

MERT SMEs from the Royal Air Force (RAF) Tactical Medical Wing. The sample was

selected from each of the PHEC levels to ensure there were equal distribution and

representation. The breakdown of the board included 26; PHEC level 5 (n= 7) , level 6

(n=4), level 7 (n=5), level 8 (n=10). All 26 board members were approached. Level 8 consultants comprised most of the sample. This is because they hold the majority of representations across the PHEC sub-speciality board and therefore there was an inherent bias within the sample. Due to the lack of definition and capability requirement for current PHEC level 6 providers, this resulted in a smaller represented number for this group. It was considered that PHEC 6 representation would not adversely impact the results of the Delphi. PHEC level 6 can be undertaken by either medical or non-medical qualified roles. From the other levels, the sample distribution included both these groups; paramedics/nurses for level 5 and medically qualified doctors inclusive of; PHEM trainees and consultants for level 7,8. Therefore there was representation across the levels of these different roles. Lastly, the sample number is larger than the sample size recommended in other literature (Hsu and Sandford, 2007). This was a deliberate decision to allow for questionnaire attrition rates and to provide adequate representation of distributed samples across each of the PHEC levels. Furthermore, this distribution was designed to help mitigate bias from one group over another regarding professional dominance or military rank (Bernthal, 2015).

The potential participants were sent an introductory email by myself explaining the Delphi study, the voluntary nature of the study and the process involved in taking part. A second email was sent with the isurvey Delphi questionnaire link, outlining the consent procedures. All emails were sent so that potential participants were unable to see who else was invited to take part. A follow-up email was sent after ten working days of each round if a response had not been received.

An additional consideration was the use of a gatekeeper to send the emails. A gatekeeper can be used to approach a sample to offer neutrality and build trust. If a researcher

approaches the sample directly it can infer pressure, impact privacy, and introduce bias. A gatekeeper can also reassure participants in terms of the study's credibility and anonymity. The decision not to use a gatekeeper for sending introductory emails was made for several reasons. While specialist advisors for PHEC could have served as potential gatekeepers, their role and influence within the Defence raised ethical concerns. These individuals often participate in interviews, selection boards and provide advice to the chain of command. Involving them as gatekeepers could potentially lead to ethical issues and concerns about their undue influence on the participants' careers. Given the small and specialised recruitment pool for the sample, finding alternative gatekeepers who could provide neutrality and mitigate ethical considerations was challenging. Therefore, I opted to approach potential participants directly, recognising there are potential issues of participants feeling compelled to take part.

In addition, the impact of military rank (between the researcher and participants) anonymity and coercion can raise ethical concerns when approaching the sample directly, especially with military participants (Bernthal, 2015). To mitigate the impact of approaching participants directly, additional reassurances were provided to the participants, assuring them that I was outside their chain of command and that their decision to participate (or not) would not impact their career. Further assurances were given regarding anonymity throughout the study about protecting the participants' identities and ensuring confidentiality. By directly approaching potential participants with these reassurances, I aimed to promote a safe and trusting environment throughout the study. The ethical considerations of the study are discussed in more detail in section 5.5.

The Delphi questionnaire

An electronic questionnaire was designed to be administered to 26 Defence pre-hospital SMEs. The instrument was prepared using 205 competencies (see table 3.6) from the Faculty of Pre-Hospital Care curriculum for technical skills (n=189) (FPHC, 2017) and the AreoNOTS framework for non-technical skills (n=16). The non-technical competencies were not in the FPHC competencies, as the focus is on technical skills and therefore the aeromedical non-technical skills framework (AeroNOTS) was added. The AeroNOTS framework is a validated observation tool to measure non-technical skills. In addition, it is used to assess performance during the MERT course. The AreoNOTS framework defines the non-technical skills required for critical care air ambulance practitioners and includes; leadership (n= 4), team working (n=3), team management (n=3), situational awareness (n= 3) and decision making (n=3) (Myers et al., 2016). These competencies are part of the training and assessment for speciality PHEC education undertaken by UK doctors. There are no other nationalised pre-hospital competencies endorsed by FPHC. In addition, after each round, there was a free text box on the questionnaire that asked if there were any further comments. This enabled participants to expand on if they were conflicted on a competency or raise anything that they felt was important or missed during this phase. The free text section was designed for qualitative analysis to be conducted on the responses where findings were identified for taking forward to Phase 2 of the study.

Procedure: questionnaire rounds

Round 1

The Round 1 questionnaire used a 'brainstorming' approach, asking participants to organise the 205 competencies into the specific PHEC levels, and was designed to facilitate specific data to be extracted from the expert panel (Okoli and Pawlowski, 2004). The electronic questionnaire was sent to each of the participants in May 2019 asking them to identify 205 competencies obtained from the Faculty of Pre-Hospital Care curriculum (FPHC, 2017) and AreoNOTS framework into the corresponding PHEC levels (appendix 2 and 3). Using a multiple-choice format, the participants were asked to identify the PHEC level (5,6,7,8) for each skill or, if appropriate, indicate where the competency applied to all PHEC levels (5-8). Taking the competency of 'use of personal protective equipment' as an example, if a participant regarded this as a requirement for all levels 5-8, they would mark 'all levels' for this competency. On completion of the questionnaires, each item was reviewed, and a percentage consensus was calculated from the number of participants. This was calculated on the number of votes for the skill against the level. Items that did not reach 70% consensus were included in subsequent rounds. Competencies that reached 70% consensus were considered as having reached an agreement (consensus).

Round 2

This round specifically asked participants to focus on competencies for PHEC level 6 and was conducted in Jun 2019. The list of competencies included in this round were those that had not reached 70% consensus in round 1. Round 2 used a different format to that of Round 1. Here, participants were asked to rate each of the competencies for PHEC level 6 practice using a 5-point Likert scale (5 = Strongly agree; 4=Agree; 3=Undecided,

2=Disagree, 1=Strongly Disagree), see appendix 4. Following data collection, it became

apparent that a 1-5 Likert scale was not specific enough to make a judgement about

consensus because the results were difficult to interpret. For example, participants could

rate an item as 'agree' rather than 'strongly agree', demonstrating a more neutral stance;

therefore it was not able to attach meaning to the responses. The scale was too broad to

be able to differentiate the strength of the responses to judge consensus between "agree"

and "strongly agree" or "disagree" and "strongly disagree". As outlined earlier in the

chapter, there are conflicting views about how to measure consensus in a Delphi study,

which has led researchers to adapt the classical approach and use a modified Delphi

technique instead (Keeney et al., 2001, Williams and Webb, 1994). Previous Delphi

designs have been used flexibly, allowing researchers to adapt and interpret the methods.

Traditionally, the classical method starts with an unstructured round 1, with subsequent

rounds focusing on specific questions to reach a consensus. For these later rounds, a

range of questionnaire techniques has been used, involving different Likert scales, short

answers, or interviews. Examples include AlShammari et al. (2018) who used a 1-10

Likert scale to measure consensus, and Kenward, et al. (2007) who used a 7-point Likert

scale in conjunction with open questions.

If a Delphi study is modified, the researcher needs to demonstrate rigour in providing a

transparent and robust decision-making audit trail (Powell, 2003, Williams and Webb,

1994). In this study, in light of the findings from round 2, the Likert scale responses were

grouped together. Responses 4 (Agree) and 5 (Strongly agree) were treated as a single

'Agree' category. Similarly, a score of 1 (Strongly disagree) and 2 (Disagree) on the Likert

scale was combined into a single 'disagree' category, 3 remained as neither agree nor

disagree and was treated as a non-agreement response. This modification was done to

achieve a clarity to determine consensus as to whether items were or were not PHEC level 6 competencies (making it essentially a binary choice, with a neutral option), as opposed to asking participants to indicate the strength of agreement or disagreement. Therefore, subsequent scales were modified in rounds 3 and 4. This change was made to reduce indecision from participants, potentially resulting in ongoing rounds of Delphi questionnaires, which carry an associated risk of attrition (Keeney et al., 2001). Lastly, it must be stressed that if the Delphi technique is modified, researchers must maintain the key aspects, such as ensuring participant anonymity (Keeney et al., 2001).

Round 3

The Round 3 questionnaire consisted of a revised list of the competencies from round 2 that had not reached 70% consensus and was sent in Jul 2019. This round used a reduced Likert scale (1=Agree; 2=Undecided, 3=Disagree) to ask participants to rate the competency as a requirement for PHEC level 6 (appendix 3).

Round 4

In Aug 2019, the Round 4 questionnaire included a summary of the findings from each of the rounds to assess the validity of agreement from previous rounds. This is known as "controlled feedback", it facilitates the Delphi panel to be exposed to the collective opinion of responses from the SMEs (O'Connor, et al. 2022). Firstly, participants were presented with an agreed list of level 6 competencies. Additional lists were presented separately on items that had not reached consensus, and for PHEM level 7-8 competencies (appendix 6). These additional lists were included to ensure that consensus remained on the items that were not PHEC level 6. This round differed from the previous rounds in which participants had been asked to review each skill and align to a PHEC level. The panel

during round 4 were asked to read the entire list of skills that had been grouped for each level following consensus on the skills from the previous rounds and, at the end, to indicate if they agreed or disagreed with the complete list of competencies. Round 4 included a reduced scale, offering agree or disagree responses, to ensure there was not a neutral option. The short answer boxes were expanded for participants to express their opinion.

Data Analysis

Each round used the same systematic approach to assess the aggregate percentage score on each item. Grouping responses and scoring collectively is recommended for Delphi studies as it reduces the risk of singular reports that may infer bias in participants' individual opinions (Hallowell, 2009, Hsu and Sandford, 2007 & Chang et al., 2010). Totals of votes from each competency were added and converted to a percentage. Competencies calculated to have reached 70% consensus were agreed as a PHEC level 6. As mentioned, competencies that collectively fell below 70% consensus were included in subsequent rounds. This reduced the list of competencies for each round regarding the number of questionnaire competency items. Specifically, for round 1, the competencies that reached 70% consensus for all levels (PHEC 5-8) were considered a baseline requirement for PHEC level 6. All level competencies accounted for n=155 items out of a total of n=205, indicating that these competencies are not specific to level 6. Therefore, they were not reviewed in subsequent rounds. This was decided upon to reduce the length of subsequent rounds. It prevented the rounds from becoming labour-intensive and ensured rounds 2-4 were specific to PHEC level 6, which was the main focus of the investigation. The second round included n=49 competencies, whilst round 3 had n=6

outstanding items. The last round outlined the final list of agreed n=45 specific PHEC level

6 competencies, PHEC level 7-8 (n=3) and items that had not reached consensus (n=2).

Qualitative Data

Rounds 1-4 collected qualitative data from the short answer boxes. At the end of rounds 1

& 2, one short answer comment box was added entitled "any further comments?". For

rounds 3 & 4, which focused on refining consensus, the following was added; "if you are

not sure or do not agree with the list of items that did not reach consensus, please use the

comments box to outline further?". Using a content analysis method, these responses

were explored. Content analysis examines qualitative findings within text (Altheide and

Schneider, 2013). This method was chosen as it adopts a holistic approach to identify

meanings, generalisations, and perceptions from the participants (Powell, 2003). In

addition, content analysis lends itself to analysing the 'content' of sentences as opposed to

narrative methods. The content of the short answer boxes was collated in a Word

document and was read to identify recurrent comments or critical ideas. These sentences

were re-read thoroughly to explore the usefulness of the content against the research

questions. Keywords and ideas were identified as early themes to be explored further in

the phase 2 interviews.

5.3 Phase 2 Semi-Structured Interviews

Phase 2 consisted of qualitative semi-structured interviews, to generate meaning and

understanding by delivering rich descriptions that emerge from data (Garner and Scott,

2013). It is useful for studying complexity, especially in healthcare, where its approach

can bring meaning to phenomena. Qualitative differs from quantitative research in that it

addresses different problems that have arisen from different philosophical views (Garner and Scott, 2013). It focuses on meaning and experience in contrast to quantitative research, which is concentrated on control and measurable outcomes.

The philosophical roots of qualitative research arise from interpretivism and constructionism, whereas quantitative approaches are founded on positivism (Garner and Scott, 2013). In terms of data collection and analysis, the researcher is the primary instrument bringing their own perspectives to make sense of data (Garner and Scott, 2013). The aim of qualitative data analysis is to explore and identify patterns and themes. Within the presentation of the findings, qualitative research then seeks to describe and interpret to make sense of the data (Grbich, 2012). This mixed methods study used an exploratory and explanatory approach. Other types of qualitative research include case studies, grounded theory, ethnography, phenomenology and narrative studies. Data collection methods include interviews, focus groups, documents and observations (Silverman, 2005). Focus groups were discounted for this study due to its inability to provide anonymity and guard against the influence of senior Officer ranked participants. Documents and observations were rejected as these approaches did not fit with the research questions, as APs are not formally in existence in an operational role therefore these methods would have been impracticable.

Qualitative interviews are considered a purposeful conversation requiring rapport with the researcher asking questions about the research subject requiring the interviewee to respond and the interviewer to actively listen (Saunders et al., 2018). Interviews can be structured, unstructured or semi-structured (Garner and Scott, 2013). Structured interviews ask fixed questions in a predetermined format considered an "administered" interview. The benefit of this is that the interviews are standardised. They are simple and

require no prior knowledge of the research area by the interviewer. Data is often

considered descriptive and lacks depth compared to unstructured approaches. These are

well suited to descriptive approaches and contrast with unstructured, which require an in-

depth knowledge of the area. Such interviews are considered a "free" interview technique,

almost "conversational between friends" (Garner and Scott, 2013). For example, the

interview may be conducted just using a topic to give freedom for the interviewee to

discuss the subject. These interviews lend themselves to exploratory approaches (Garner

and Scott, 2013).

Semi-structured interviews were chosen over other interview methods. This method is

well suited to both explanatory and, in some cases, exploratory research, as it is bounded

by a loose question format. The choice of a semi-structured process facilitated asking

questions in different ways to different people to obtain a rich understanding of the

research area. It is an approach favoured in exploring complex issues (Barriball et al.,

1994). This method uses a question format based on a loose schedule that could be

adapted and tailored following contemporaneous data analysis (Silverman, 2005, Barriball

et al., 1994, Gorden, 1975). Data analysis was conducted after each interview, which

informed any interview questions' adaptation.

The interviews followed on from the Delphi study, allowing important topics from the

participants to be explored in more detail using a semi-structured approach. This

facilitated a deeper understanding of the initial topics identified in the Delphi study to gain

more detailed insights about the AP role.

Aims of the interview

The interviews aimed to understand the AP participants' experiences of their current

training, preparation and ongoing requirements for the AP role during their peacetime

posting. In addition, explored the AP's experiences during previous pre-hospital

deployments and the extent to which they had used their additional skills. Although these

participants were not formally deployed in the role of an AP, they were trained as APs,

their experience on the deployment helped to provide data and context for the study. The

non-AP interviews were conducted with members of the subspecialty board for PHEC.

This set of interviews were used to explore from the multi-disciplinary team on their

experiences of the APs' role in terms of role understanding, expectations and perceptions.

The interviews also explored conflicting views about level 6 competencies and

requirements that arose in the Delphi study.

Interview conduct

The interviews were conducted face-to-face or via virtual video conferencing between

September 2020 and April 2021. Between the Delphi and the interviews, there was a gap

of 10 months which facilitated interpretation of the Delphi data to inform the interview

questions. Participants were given the choice of when and how appointments for the

interview were made. However, due to COVID-19 constraints around the time of the

interviews, the preferred method was virtual means. COVID 19 did not impact recruitment,

but it did restrict scheduling of interview appointments due to clinical shift timings for

participants. Skype facilitated interviews to be conducted in a place and time of the

participants choosing. There were 18 interviews conducted via Skype, three face-to-face

interviews and one was conducted by telephone. The duration of the virtual interviews

was about 40 minutes on average, with a minimum duration of 18 minutes, and a

maximum of 47 minutes. Before the main interview, questions were asked as a "warm-up" to the main interview around their job description, clinical/academic background, local training, clinical exposure and deployment history.

Sampling and identifying participants for interview.

Purposive sampling for the interviews was undertaken to include both current military APs and non-APs. The participants were purposely selected based on their military experience, regardless of service. Military APs were approached from all three services (Army, Navy & RAF); the APs were current and practising at an advanced clinical level. In addition, they were MERT qualified and had previously deployed. Non-APs were sampled from the Defence Sub-Specialist Pre-Hospital Board. From this group, a minimum of 12 non-APs were invited to take part. From both groups, 9 participants took part in the Delphi question set.

For qualitative research, adequate justification of the sample size is relied upon to help assess the quality and validity of a qualitative study (Vasileiou et al., 2018). Sample size in qualitative research is sometimes determined by the concept of 'data saturation' (Vasileiou et al., 2018). Saturation is regarded as "information redundancy" where no new data is gathered (Lincoln and Guba, 1985). However, judging when saturation has been reached for qualitative research can be conflicting. There are several theories on what constitutes an 'adequate' sample size to achieve data saturation. One approach uses an absolute number of interviews known as "operationalisation" (Braun and Clarke, 2019b). In terms of operationalisation, Guest et al. (2006) suggests that to reach saturation, it would take between 6 to 12 interviews (Guest et al., 2006). Other authors advocate using the results from a thematic analysis alone to judge saturation (Vasileiou et al., 2018). This facilitates a continuum of analysis to establish patterns and replication in the data, guiding

the researcher towards saturation. Other papers suggest a more pragmatic stance to determine a sample size so that it might be bounded by practical considerations such as available time to do the research, resources and availability of participants (Braun and Clarke, 2019b).

All three of these approaches were employed to judge data saturation for this study. At the start of the study design, using the Guest et al. (2006) method, an estimation was undertaken to determine a target of 24 (12 APs and 12 non-APs) interviews in both groups. As the study progressed, thematic analysis was used to decide on the "in situ" number for the sample size (Braun and Clarke, 2019b). In addition, practical considerations regarding time and resources available were deliberated. However, the overarching method to definitively decide on saturation was guided by thematic analysis.

Recruitment

Potential participants were identified from the subspecialty board for PHEC. For AP participants, the Defence Specialist Advisor for nursing and paramedics was approached to assist with the identification of potential participants. An email was sent with an invitation to an optional briefing outlining the study's aims. A subsequent email was sent containing copies of the participant information sheet (PIS) and consent forms. Within the PIS, it was stated that participation in the study was voluntary and that participants were free to withdraw at any time. If they declined to volunteer, it was outlined that it would not adversely affect any training or career outcome.

Furthermore, the email emphasised that potential participants should consider the information for 24-48 hours before returning their consent forms.

Data Collection

The first set of interviews focused on exploring the experiences of current military APs who had previously deployed on MERT operations. The second round of interviews was with non-APs to investigate the pre-hospital multi-disciplinary team members' views, including doctors, nurses, and paramedics (PHEC SMEs). Interviews with PHEC SMEs focused on their perceptions and understanding of a military AP and its potential contribution to military pre-hospital care. Lastly, additional Delphi related questions were asked with participants who previously participated in the Delphi study, a total of 9 people. These participants were asked specific questions relating to conflicting themes from the Delphi Study undertaken in Phase 1. These sets of interviews are discussed in the following sections.

Interview guide

Semi-structured interviews require a question guide or schedule. The question guide was formulated from the literature review and the themes from the Delphi study. See table 5.1 for the breakdown of the questions asked. The initial questions were designed to open the subject of APs and explore participant's understanding of AP roles in both civilian and military environments and views about the role in terms of potential benefits for patient care. The AP questions were kept open to ascertain what was already known about the subject from the non-AP group. Lastly, the questions focused on seeing a future part for an AP within the DMS. At the end of the interviews, both sets of participants were asked if they had participated in the Delphi study. On confirmation during the interview, specific questions on PHEC level 6 skills and practice, focusing on the debated items from the Delphi study were explored.

Table 5.1 Semi-structured interview questions

AP Questions	Non-AP questions	Delphi Questions
Introduction: Please describe your experience of Advanced Practice in the firm base including relevant military deployments?	What is your understanding of a Advanced Practice roles, military and civilian	What skills should a level 6 practitioner have to be able to manage a chest injury over 24-48hrs?
In terms of your AP training, what did that include, how was this translated into practice?	Do you feel the AP role has any benefits to patient care?	In regards to perimortem c-section should level 6 be qualified in this, what are your thoughts re the likelihood?
What is your primary role when not deployed?	What do you think supports or inhibits the AP role?	What level of advanced airway skills does PHEC level 6 need, should they be trained to intubate?
During your previous pre-hospital deployments did you find there were any aspects of your AP qualifications and experience that could have enhanced patient care delivery? Can you expand, why do you think that? What was your experience of working within the deployed team as an AP?	Do you think APs should be deployed in military pre-hospital care? If so, in what capacity?	Should level 6 practitioners be trained in ultrasound? What areas should it cover and why?
What do you feel supports or inhibits the role, both in peacetime and deployments?	What is the utility of a Military Level 6 practitioner?	What role should be recognised as level 6 ? (Nurse, GP and paramedic)
Do you think APs should be deployed in a pre-hospital environment? If so, in what capacity?	Could an AP operate at PHEC level 6? What would be the barriers, what additional training do you think APs should have?	
What additional training do you feel is required if you were to be deployed operationally in a pre-hospital setting?		
Are there other aspects of the		

role you feel should now be the focus for development, such as deployment opportunities, career pathways etc?		
Is there a place for Level 6 practice in military pre-hospital care?		

AP interviews

These interviews aimed to investigate research question 2: 'What is the current work and practices of military APs in practice?'. Semi-structured interviews were conducted with military pre-hospital APs who had previously deployed as level 5 practitioners (nurse or paramedic) on MERT operations. Although not formally deployed in the role of an AP, their MERT operational background and experience combined with their day-to-day working as an AP in the NHS provided data and context for the study. Ten regular and reservist participants trained to AP level fitted the above criteria from the Army, Navy and RAF. The interviews gathered an understanding from an AP point of view of their current training, preparation and ongoing requirements during their peacetime posting. Concerning military operations, further questions were tailored to understand their experiences during their pre-hospital deployment. More specifically, questions were asked to explore if their additional skills were utilised and how their role impacted the deployed team.

Non-AP interviews

Interviews were conducted with non-APs who work, or come into contact with, APs in NHS settings. As there are no formal deployments for qualified APs, this group consisted of

military nurses, paramedics and medical Officers who already work with civilian APs and a handful of military APs working in the NHS outside of their deployed role. In total, 12 non-AP interviews were conducted. The non-AP group of interviewees facilitated an understanding from the multi-disciplinary team perspective of their experiences of the APs' role in terms of what is currently known of the role, expectations and perceived utility for APs on a deployment.

Questions with Delphi study panel members

This was a sub-group of questions conducted with both sets of interview participants who were identified during the course of the interviews. These questions were designed to assess research question 1, 'What is the consensus of military personnel on the clinical and non-clinical skills for level 6 pre-hospital emergency care?'. The Delphi study was expanded upon to ensure research question 1 and non-consensus opinions were explored more fully using interviews. From the analysis of the Delphi study, key topics which were generated regarding PHEC level 6 practice, were utilised to inform the interview schedule. Due to the anonymity of the Delphi study, it was impossible to identify Delphi participants before the interviews. However, from the non-APs these were members of the sub-speciality PHEC board. Additionally, there were some APs that were also members. Any of the participants that were members of the PHEC board (both APs and non-AP participants) were asked if they had taken part in the Delphi study during the interviews. Upon confirmation, questions were asked to explore the above issues further.

Data analysis

Qualitative data can be analysed in different ways. The chosen method is dependent on the needs and requirements of the study. Thematic analysis was chosen for this study as it is commonly used as a foundation method, providing a clear presentation of data through themes (Garner and Scott, 2013). Thematic analysis was selected over content analysis as it allows for a more inductive and in-depth method for the study. The thematic analysis provides deeper meanings beyond content analysis, which searches for patterns and sequences through text.

Notes were made during the opening questions which aimed to formulate a characteristics description of each interview participant. All interviews were transcribed verbatim.

The data was analysed using the six-step thematic analysis by Braun and Clarke (Braun and Clarke, 2006). Table 5.2 describes the steps taken in the thematic analysis. Thematic analysis is used to identify patterns and meaning within data. It can be used inductively or deductively to make sense of extensive data, and in this study both approaches were used. During the analysis, some themes were anticipated (from the literature review), for example, advanced skills and role conflict. As such, some a priori codes were used in a more deductive approach. However, reading and coding the data identified themes such as trust and tribal working that were unexpected. This combination is sometimes referred to as abductive reasoning (Lipscomb, 2012).

The six-step approach offers a framework that can be adapted to whichever method best fits the research question (Braun et al., 2014). Thematic analysis works well in various qualitative approaches such as interviews, action research, and media texts (Braun et al., 2014, Ryan and Bernard, 2003). During the analysis phase, the data was read continuously; the researcher engages throughout to extract themes. Braun & Clarke consider this an active process. It facilitates coding and themes to be changed as the data

evolves. The framework is a guide and is not intended to be rigidly followed; moreover,

the literature considers using this approach to be a creative process which is not linear

(Clarke and Braun, 2013, Braun et al., 2014).

Table 5.2 Thematic Analysis Phase 2

6 Step analysis	Description	Action
Step 1 immersing within the data	The data was analysed to understand initial findings, impressions and developments (Grbich, 2012), this is known as the researcher becoming familiar with the data.	Transcripts were read, and memos were kept of initial thoughts and patterns
Step 2 Initial coding	Braun and Clarke consider a "code" as a "pithy" label that captures what's interesting about the data" (Braun and Clarke, 2019a).	Sentences coded using Quirkos Software
Step 3 Deeper understanding	The data was further explored to gain a deeper analysis, specifically searching for themes, patterns and generalisations (Ryan and Bernard, 2003).	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.	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 formally reported, and the conclusion.	Results from Phase 1 was applied in the mixed-methods analysis

Braun and Clarke advocate that coding is an informal process focusing on areas of interest

within the data, compared to other formal coding methods seen in grounded theory

approaches such as open, axial and selective codes (Grbich, 2012). Codes can be

'surface' codes, such as prominent concepts within the data or deeper following in-depth

data analysis.

The transcribed data was organised and stored using Quirkos software. Quirkos is considered a "lighter" version of qualitative data software compared to other software packages with additional features, which are classed as tiered software depending on the researcher's needs (Evers, 2018). An example of a software-tiered approach which ranges from basic to professional would be NVivo starter, pro and plus or MAXQA base, standard and plus. Lighter versions of qualitative software, such as Quirkos were introduced in 2013 to provide user-friendly software without the additional unwanted features that come at an extra cost (Evers, 2018). These lighter software packages have several benefits; ease of use, shorter training time, cost-effectiveness and having the right amount of features to assist the novice researcher. The tiered system facilitates the advancement of software to complement the researcher's experience (Evers, 2018). Nonetheless, whichever data software package is chosen, its primary function is to retrieve, sort and store the data. It will not perform the analysis.

Using Quirkos combined with Braun & Clarke's (2019) thematic approach facilitated the data to be coded creatively. Transcribed data was dragged into a labelled bubble to form a 'Quirk' using the Quirkos software. The "Quirks" are the coloured bubbles, seen in Figure 5.1. The "Quirks" get bigger as more text is added, presenting a visual representation of a theme. The "Quirks" can be combined and built into themes as the researcher becomes more familiar with the data. In summary, Quirkos enables data management, coding and visual display of themes.

Figure 5.1 Quirkos Bubbles

The software complements Braun and Clarke's thematic analysis method as it allows the

researcher to be creative during the coding and not be held in a linear or rigid approach.

5.4 Methodological Rigour

Within qualitative research, rigour and quality are required to demonstrate if the research is trustworthy (Connelly, 2016). Qualitative methods draw from personal perspectives to generate theory and bring meaning by using an interpretative approach to explore different viewpoints. Nonetheless, there is still a requirement for the researcher to ensure it is conducted rigorously, reflexively and transparently (Shenton, 2004, Braun et al., 2014). Qualitative research that lacks rigour has been criticised for presenting a personal opinion that is not replicable or generalisable (Seale and Silverman, 1997).

Generalisability in relation to qualitative research is understood if the data can be applied to the wider population versus just the sample it studied (Garner and Scott, 2013). Another way of looking at this is to ask if the qualitative findings have relevance, not necessarily to the entire population; moreover, the area of speciality it researched (Garner and Scott, 2013). Considering replicability and falsifiability instead of generalisability may assist readers in drawing connections between the data and their conclusions (Garner and Scott, 2013). Regardless, the study must consider rigour. Rigour is required to provide confidence in the qualitative methods used, more specifically in the interpretation and reliability of the findings (Polit and Beck, 2004). Guba and Lincoln (1989) suggest demonstrating trustworthiness and rigour within qualitative research by exploring the following principles; dependability, credibility, transferability and confirmability (Connelly, 2016, Guba and Lincoln, 1989).

Credibility

Credibility in qualitative research is the ability of the researcher to present the truth within the findings and, therefore, judge if it can be trusted (Polit and Beck, 2004). Trustworthiness whilst undertaking qualitative research is crucial to ensure the results are credible and rigorous (Rolfe, 2006, Braun et al., 2014). To enhance credibility, it is common for qualitative researchers to use one or more of the following methods: prolonged engagement, persistent observation, triangulation, peer debriefs, negative case series, referential accuracy and member checking (Terrell, 2015). There are other types of methods to ensure credibility, and one of these includes a reflective diary. A reflective diary was kept to ensure the research was transparent and reflexive. The diary was used to provide initial thoughts, impressions and feelings in relation to the study. This ensured the study was transparent and focused on reflection to be aware of my own "lens" in reference to the data (Braun and Clarke, 2019a). It enables the researcher to step outside the data and be aware of their thoughts to pick up biases that could skew the findings. The diary method facilitated a deeper understanding and neutral grounding throughout the analysis and decision-making for phase 2.

Dependability

For qualitative research, dependability is concerned with demonstrating that the investigation is consistent and replicable (Guba and Lincoln, 1989). Criteria for which the data is trustworthy depend on reliability. During the interviews and analysis, reflective discussions during clinical supervision sessions enabled sharing of early findings and themes. This helped to mitigate personal biases and explore early concepts during the

interpretation of the data. Involving additional people in the research can enhance two areas of dependability; firstly, if it can be repeated to establish similar findings. It could be argued that one of the limitations of using a flexible semi-structured approach is that replicability is not possible, as questions are tailored towards the participant data collection. Therefore, the interview can never truly be replicated or compared, as in the case of quantitative methods (e.g. Randomised Controlled Trials). However, qualitative methods are less concerned with replicability, but there is a need for consistency and transparency in the approach taken. To enhance dependability, checking the analysis and interpretation with other people, such as participants and supervisors, ensures the research has not been conducted entirely through the researcher's lens.

However, there are some potential challenges with "member checking". For example, some qualitative researchers send the entirety of their transcripts to the participants after the interview to check the level of agreement. The risk associated with doing this level of member checking is that participants may now change their minds, going back on their views and opinions. Therefore, it does not necessarily provide validity and can lead to a false account of what was said. Nonetheless, member checking in a basic form can be useful for building the case of qualitative credibility.

Transferability

Transferability within qualitative research relates to understanding if the themes or concepts can be transferred between different settings and not just the specific area that the study is concerned with (Connelly, 2016). It is judged on its ability to provide a "thick" description of the data to address the question fully. Transferability can be assured

through a nominated sample representative of the subject area and designated to the area specialism. For this study, military PHEC could be regarded as a unique and distinctive area; however, transferability in this context could be judged on if the study could be transferred between all three military services (Army, Navy and RAF) and, in some respects, relatable to a civilian PHEC environment. Regardless, to prove transferability, the researcher needs to provide a "thick description" to enable the reader to determine if the research is transferable to their area.

Confirmability - Insider versus outsider perspectives

Confirmability is judged on if the research is neutral in its approach (Polit and Beck, 2004). In addition, it depicts a transparent presentation, removing personal bias and thus demonstrating its replicability (Connelly, 2016). The researcher's positionality is crucial when conducting qualitative research regarding insider versus outsider perspectives (Silverman, 2005). Maykut et al. (1994) describe insider versus outsider statuses as "paradoxical"; therefore, the research must "be accurately tuned in to the experiences and meaning systems of others-to indwell-and at the same time to be aware of how one's own biases and perceptions may be influencing what one is trying to understand" (Maykut and Morehouse, 1994). Many vital issues surrounding role boundaries must be considered when understanding the dynamic nature of research interviews, especially in a military context. From an insider perspective, my role as a nurse, military colleague, rank and researcher will invariably influence the collection and interpretation of the data.

Firstly, my role as a military colleague, nurse and advanced clinical practitioner could affect the research. Although there are benefits as an insider offering an assumed

knowledge base on the subject, it can have some negatives (Dwyer and Buckle, 2009).

Dwyer & Buckle (2009) suggest that the researcher can fall into the pitfalls of personal

biases and assumptions, which could skew the research. The more insider knowledge the

researcher has can result in difficulties unscrambling what is a personal view and data

(Dwyer and Buckle, 2009). Lastly, my position within the military hierarchy in terms of

rank. Military rank has a distinct relationship with power and, therefore, further compounds

role boundaries and relationship issues which can impact consent in terms of cohesion

(Finnegan, 2014b). In addition, the rank gradient may have associated dynamics

regarding behaviours or perceptions that participants may exhibit when dealing with

different grades of rank (Bernthal, 2015). Furthermore, different roles, doctor, nurse,

paramedic, and AP, may also exacerbate this problem. Both rank and role positions

impact insider-related research and can carry a risk of a hawthorn or observer effect on

participants, a well-known phenomenon. For example, responses may be alerted to

express different views, as opposed to the honest view held by the participant, as they

may feel the researcher would not accept it. It was vital to be mindful of these challenges

to ensure the research was designed transparently and ethically. To minimise the impact

of these problems, it was essential to promote a neutral environment. Practical

considerations were implemented to rebalance potential power issues, such as conducting

the interview out of military uniform and using first names terms to promote a collaborative

partnership (Bernthal, 2015). It was apparent for some participants that virtual interviews

indirectly encouraged a relaxed culture compared to face-to-face interview methods. This

would fit with Opdenakkler et al. (2006) view, which considers that face-to-face interviews

increase issues associated with power and relationships. Despite the above challenges,

insider research can positively affect qualitative research, especially in relation to having a

deeper understanding of the subject area. It allows the researcher to have credibility with

the participants in terms of having a breadth of experience and knowledge about the contextual elements of answers given (Finnegan, 2014b). For example, this tacit knowledge negates the need to break down the military jargon, such as Role 1 (medical treatment facility) or OP HERRICK (Afghanistan conflict). This insider view helps reduce the need for the participant to explain or define the terms given, thus maintaining the natural flow of the interview (Bernthal, 2015). Having a depth of understanding of the roles can 'bond' participants with the researcher, facilitating honest and open answers and generating rich data (Finnegan, 2014b). Participants may view the researcher as an advocate, giving an AP a voice. However, regardless of the insider and outsider perspectives, qualitative research must be reflexive. Considering the above issues around the researcher's position and its broader military implications, it is imperative to ensure data collection is transparent (Bernthal, 2015). Qualitative research and its data interpretation rely on the researcher to be impartial and self-aware to confirm that the findings concluded from the study are credible, this is further explored in chapter 10.

5.5 Ethical considerations

Informed consent is critical to any research; it is a legal and ethical requirement. Informed consent requires the researcher to provide all of the details of the study to enable a participant to be conversant before consenting (Finnegan, 2014a). The details must be transparent and comprehensive to facilitate the participants to weigh up any risks associated with the study and understand how the data will be used. Informed consent consists of 9 elements:

1.   Research statement

2.   Risks and discomforts

3.   Benefits

4.   Alternatives

5.   Confidentiality

6.   Compensation

7.   Contact person

8.   Voluntary participation

9.   Management of data

The consenting processes and details of the study are required to be submitted to the institutional review board (IRB) (Garner and Scott, 2013). For this study, ethical applications were submitted for IRBs in the UK Defence and the University of Southampton. The Delphi study was submitted to the RAF Scientific Advisory Board (SAC) to consider if this PhD phase required full ethical approval. The committee concluded there were no ethical concerns for the Delphi questionnaire, providing anonymity of the participants was maintained (appendix 8). Anonymity is a key principle for the Delphi study however is pertinent to the UK military due to the hierarchical considerations previously mentioned. Aside from the above Delphi requirements, more broadly, it is noted that military participants require additional reassurances that their information will remain confidential and that their identity will not be divulged to their chain of command (Bernthal, 2015).

Following the RAF SAC decision, the Delphi study received ethical approval from Southampton University ethics committee, known as ERGO. Therefore, permission from both RAF SAC and ERGO (46633) was given to proceed (appendix 9). For phase 2 of this study, this was again submitted for ethical consideration to the RAF SAC board. Following

consideration by the RAF SAC, a full ethical application was sent to the Ministry of Defence Research Ethics and Committee (MODREC). The study received ethical approval from MODREC ref 887/MODREC/18 11 Jul 2019, and this was further approved by the University of Southampton ERGO 46636.

Potential participants were emailed by myself a participant information sheet (PIS) and consent form to review during the invitation stage. It was made clear that participation for the study was voluntary, and participants were free to withdraw at any time. Furthermore, 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 (Bernthal, 2015). Consent and participant information forms were sent to all participants via email; the participants were given a 48 hours cooling-off period before signing the consent form (see appendix 8). This was to enable time to understand the information and ask any questions.

All data relating to the interviews was handled and managed in accordance with the Data Protection Act 2018.   Data relating to the study included; audio recordings, consent forms, transcribed interviews and records of data. All data relating to the study will be held for a total of 10 years in accordance with MoD policy. Consent forms were sent to the MODREC Secretariat upon completion of the research and retained for 50 years.

5.6 Funding

The study is jointly organised through Southampton University and the Academic Department of Military Nursing. The PhD research was funded as part of a Thames Valley Health Education England Fellowship and RAF.

5.7 Conclusion

This chapter has presented the data collection methods used for Phases 1 and 2 of the study. Phase 1 consisted of a Delphi approach to assess consensus and agreement on the clinical skills related to PHEC level 6 care. Phase 2 used semi-structured interviews to explore the experiences of current military APs who have deployed previously on pre-hospital operations. Phase 2 also included interviews with military APs and pre-hospital multidisciplinary team members (doctors, nurses and paramedics) to explore the current perceptions and understandings of military APs and their potential contribution to military pre-hospital care. Both sets of interviews further explored questions raised by the Delphi study findings and broadened data obtained from the Delphi study.

The results of both phases are presented in chapters six and seven of the thesis, providing a comprehensive analysis of the findings from the Delphi study and the interviews to address all of the research questions. The next chapters will present results from both phases to recommend the clinical skills for PHEC level 6 and provide insights into the experiences and perspectives of military APs.

Chapter 6: Consensus for level 6 clinical and non-clinical skills - results from Phase 1: the Delphi Study and Phase 2: Qualitative interviews.

6.1 Introduction

In this chapter, findings are presented which draw on both the Phase 1 Delphi Method and Phase 2 Semi-structured interviews. Both phases of the study are integrated as part of a mixed methods design. Results from both study phases were brought together in this chapter to enable a holistic approach to address RQ1. This chapter presents a combination of quantitative data (from the Delphi study) and qualitative data (written open text comments from the Delphi survey and qualitative data from the interviews). The analysis of the data aims to present a comprehensive picture to address RQ1.

This first phase used a Delphi method, which is a structured and iterative approach that involves gathering input from a panel of experts to reach a consensus on a specific topic. The chapter is split into three parts. Part A presents results from each round for the quantitative section (the Delphi study). Before moving onto Part B which describes the competencies that had not reached a consensus. This was undertaken by analysing the qualitative data from the narrative responses collected from the short answer boxes (from the Delphi study). Two types of qualitative data were collected; firstly from the short answer boxes where narrative analysis was undertaken (Part B) and secondly from Phase 2 interview questions (Part C). Part C presents the data findings from Phase 2. From Phase 2, the semi-structured interviews were expanded on by following up on the Delphi

study results. Overall, the findings from this chapter will contribute to the understanding of the skills and capabilities required for a military AP to perform at PHEC level 6.

6.2 Part A: Delphi Results

The response rate was consistent for each round of the Delphi study (table 6.1). In round 2, there were 25 participants rather than 26 because one person left the Armed Forces during the study phase. The following sections present the results for each of the rounds. A presentation of qualitative findings will follow this.

Table 6.1 Summary of Delphi Data

Rounds	Questionnaire sent	Response Rate, number (%)	Total number of competences	Number of competences reaching consensus for all PHEC level	Number of competences reaching consensus PHEC level 6 only	Number of competences reaching consensus PHEM level 7-8 only	Number not reaching consensus for any level
1	26	19 (73%)	205	155	0	2	48
2	25	18 (72%)	48	n/a	41	1	6
3	25	19 (73%)	6	n/a	4	0	2
4	25	18 (72%)	48	n/a	45	3	2
Total			205	155	45 (69% agreement)	3	2

Figure 6.1 displays data to show non-consensus from round 1. Figure 6.1 presents 50

competencies that failed to gain 70% agreement as competencies across all PHEC levels

(Level 5-8) during this first round. These 50 competencies were put forward in subsequent

rounds with a focus on refining to level 6 competencies.

Figure 6.1 Non-consensus for all PHEC levels 5-8 round 1
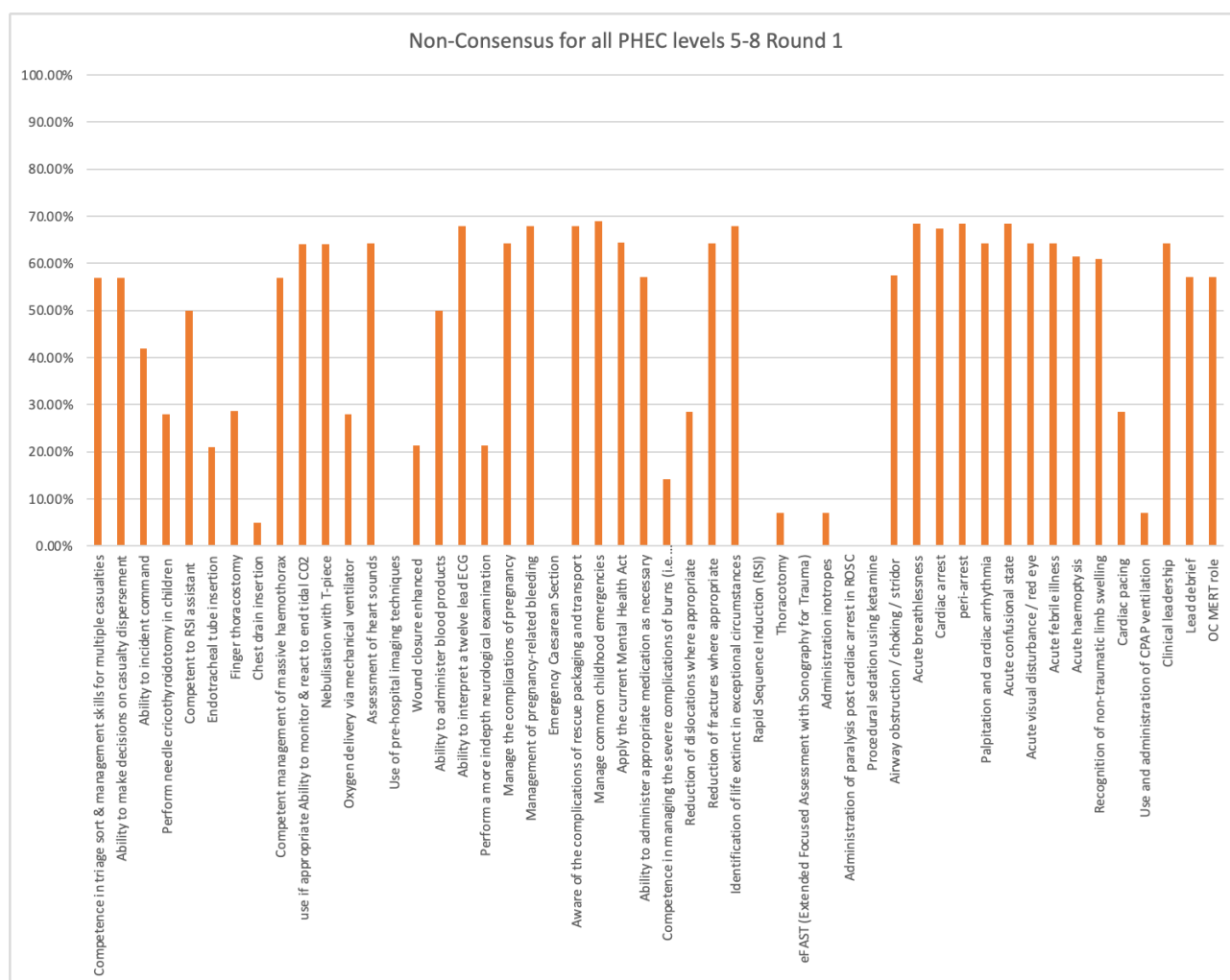
The FPHC competencies presented in Table 3.6 formed the basis for the Delphi study.

Figure 6.2 presents the consensus levels for the competencies related to PHEC Level 6.

The competencies within FPHC are utilised across all levels. The competencies depicted

in Figure 6.2 were selected from the Delphi participants for PHEC Level 6 care and aligned with the themes drawn from a narrative review related to PHEC Level 6 care.

These competencies were presented as a final list in round 4. The competencies encompass skills such as sedation, advanced life support (ALS), and inotropic support. The findings align with existing literature on skills relating to PHEC APs.

However, it's important to acknowledge that there were conflicting opinions among participants regarding specific competencies. There was no unanimous consensus on competencies such as chest drain insertion, endotracheal intubation, escharotomies, and point-of-care ultrasound (POCUS). The debate remained throughout the rounds, and when the final list was presented to the sample, despite a final vote, the list achieved 69% agreement overall. This lack of consensus was further reflected in the conflicting comments provided by participants presented in the short answer boxes (presented in Part B). To resolve this, additional data was collected in Phase 2 (presented in Part C) before a comprehensive consensus could be reached.

Figure 6.2 Consensus for PHEC level 6 rounds 2-3
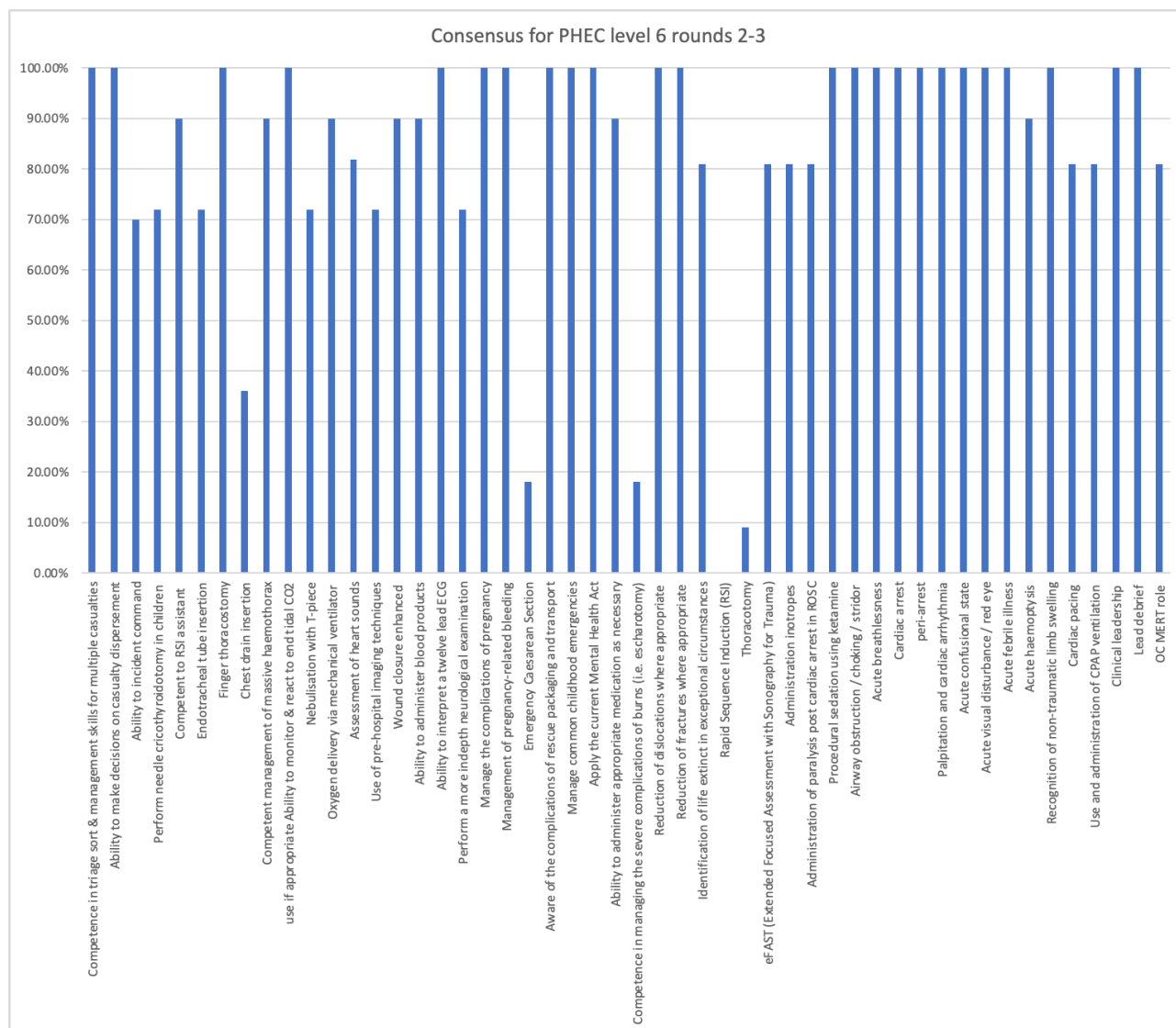
6.3 Round 1

From 205 items outlined within the Faculty Pre-Hospital Care curriculum, a consensus was reached on 155 competencies for all levels PHEC 5-8. PHEA and thoracotomy (n=2) were unanimously decided on as skills specifically for 7-8 providers. This left 48 items that were included in round 2 of the Delphi study that had reached consensus. Of note, the

administration of blood products did not reach consensus, 53% of participants felt this was a level 5-8 competency, and 47% voted that the skill was beyond a level 5 provider. Blood is currently administered by level 5 practitioners in the UK military, suggesting that there may be confusion regarding the level 5 scope of practice. Similar issues were seen in other competencies.

6.4 Round 2

In round 2, of 48 questions that specifically focused on level 6 practice, 41 (85.4%) competencies reached consensus. It was found that caesarean section was not within a PHEC level 6 scope of practice, as it reached 18% of the votes. Caesarean section is a surgical skill normally practised by a PHEM level 8 doctor. In view of the literature, it was removed and put to test in round 4, presented in the PHEM level 7-8 list (IPTPHEM, 2015, Battaloglu and Porter, 2017, von Vopelius-Feldt and Benger, 2013). This left 6 out of 47 (12.5%) items that did not reach consensus: the ability to incident command, perform needle cricothyroidotomy in children, chest drain insertion, competence in managing the severe complications of burns (i.e. escharotomy), eFAST (Extended Focused Assessment with Sonography for Trauma) and performing the role of Officer in Command (OiC) of MERT.

6.5 Round 3

From the responses given in the short answer boxes in round 2, it appeared that for the 6 remaining items, there was confusion regarding the competency statements.

'Some of these questions are too vague - for example, management of haemoptysis could mean a myriad of things - could mean give o2 could mean perform RSI' (survey ID 3433610 Round 2).

'The expectations of practitioners of different levels will be different, particularly in the management of medical conditions, and this needs to be explored and captured in subsequent rounds' (survey ID 3394393 Round 1).

To ensure specificity, the last 6 items were therefore revised, giving further detail to reduce ambiguity. For example, eFAST (Extended Focused Assessment with Sonography for Trauma) was revised to 'Can perform pre-hospital ultrasound scanning; eFAST (Extended Focused Assessment with Sonography for Trauma) and echocardiography'. The following items were agreed to not fit any military PHEC level; 'chest drain insertion' and 'managing severe complications of burns in the pre-hospital setting', for example, 'can perform an escharotomy'. Competencies for level 7-8 (n=3), level 6 (n=45) and items which were not agreed for any level (n=2) were feedback to participants in Round 4.

6.6 Round 4

For the last round, candidates were asked to review 45 items that had reached consensus as being PHEC level 6 from previous rounds. Participants who were unsure or did not agree were directed to the comments box to outline further. The PHEC level 6 list fell short of an agreement by 1%, achieving 69% consensus. From the short answer boxes, it was clear that a debate around 2 items contributed to the lack of consensus; Endotracheal

intubation and eFAST/POCUS which resulted in level 6 competencies that did not reach 70%. The 3 items that were agreed as PHEM level 7-8 in previous rounds did reach consensus for this round, with 78% agreement. However, from round 4, one participant felt perimortem C-section should be included as a level 6 skill.

'If peri-mortem C section is within a clinician's competence and is a potentially life saving procedure they should proceed even if a Level 6 clinician'. (ID 3552710) round 4.

The 2 items that did not reach consensus (escharotomy and chest drain insertion) for any PHEC levels and the two debated level 6 items (endotracheal intubation and POCUS) are explored further in section 6.8.

In summary, of the 205 FPHC competencies, 155 were agreed upon as a requirement for all PHEC levels. From rounds 2-3, 45 competencies were agreed as PHEC level 6, and this was confirmed in round 4 with agreement by 69% of the participants. For PHEM levels 7-8, three items were agreed at 78%, leaving two items that did not reach consensus. See table 6.1 bottom row which summarises the above data. Despite reaching 69% agreement for the PHEC level 6 list, this did not reach the 70% threshold advised as deemed necessary for this Delphi study. The ongoing debate around different skills was found in the short answer responses, which are reported in section 6.8.

The next sections will outline the qualitative data from the short answer boxes following the content analysis. In addition, relevant data was taken from the Phase 2 Delphi-specific interview questions. The qualitative findings below provided depth in relation to the above-debated and non-agreed military PHEC competencies. This section of the study presents additional themes taken forward that informed the Phase 2 element of this research and contributed to the final mixed methods analysis.

6.7 Part B: Qualitative responses from the short answer open-text questions

The following section presents findings from the short answer boxes. Analysis of responses indicated that there were contrasting views from the participants regarding specific skills and their requirements for PHEC level 6 practice. In round 1, there were comments from a total of seven participants. For round 2, six participants provided comments. In round 3, five participants shared their comments, and in round 4, the number of participants who commented increased to 11. Due to the anonymity of the Delphi, it is impossible to identify who had made the comments. To demonstrate the views from the range of participants, quotes are presented from the data and given the isurvey identification number along with the corresponding round.

From the responses, there were 2 recurrent themes; competencies that did not reach a consensus and opinions on PHEC level 6 practice, inclusive of clinical exposure and roles. Competencies that did not reach a consensus remained conflicted for several reasons. From the short answer boxes, some participants commented that some items were not appropriate for different operational contexts, such as humanitarian, battlefield or prolonged field care environments. In addition, some of the skills taken from the FPHC had been updated since the curriculum had been written due to new evidence which informed changes in training, local practices and procedures. For some skills there was a question if the competency was appropriate for PHEC level 6 practice or military pre-hospital care as the FPHC curriculum is civilian based. Regarding PHEC level 6 roles, different participants mentioned specific roles such as CCP, paramedic, nurse or GP to undertake level 6 duties. These views are in keeping with literature where pre-hospital roles and their definition remains contentious (van Schuppen and Bierens, 2011, von

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Vopelius-Feldt et al., 2013). Lastly, concerns were raised regarding specific clinical exposure in relation to the risk of skill fade, operational need and training required to undertake PHEC level 6 practice. Participants felt that it's not solely about PHEC level 6 skills; rather, it's essential to take into account the balance between assessing patient risk and weighing the potential benefits. Additionally, the importance of providing comprehensive training, meeting operational requirements, and ensuring the ongoing maintenance of competence to mitigate against skill fade.

Competencies that did not reach consensus

Round 4 was selected as the ideal stage to present excerpts from the short-answer boxes. This decision was made because it marked the final round, allowing participants to review the Delphi results comprehensively and offer their concluding comments. From round 4, two items failed to reach a consensus: chest drain insertion and escharotomy. In addition, from the previous PHEC level 6 agreed competencies, two items, endotracheal intubation and ultrasound, were debated. The analysis of the short-answer responses revealed by participants is presented below.

Escharotomy

Twelve participants felt that escharotomy was considered an outdated intervention and was rarely required in the pre-hospital environment. Concerns were raised that if PHEC level 6 practitioners were trained in this skill, it would be unlikely that they would ever

practise the procedure, resulting in skill fade. There were no other counterviews from participants who had voted for the skill to be a level 6 competency:

'Maintenance of extended surgical skills unlikely to be of benefit. Novel chest decompression devices should remove requirement for urgent chest drains and escharotomies rarely if ever required pre-hospitally' (survey ID 3486159 Round 4).

'Escharotomy is also very rare in the PHEC setting - this procedure is relatively simple however cannot be practised and relies on practitioners having gained surgical skills elsewhere; this would be very hard to consistently achieve at L6' (survey ID 3562514 Round 4).

Endotracheal Intubation

From the short answer responses, endotracheal intubation caused the most debate. Participants felt that the use of supraglottic devices would replace the requirement to intubate. Some participants were concerned about maintaining PHEC level 6 clinical currency for this skill. Again, participants that voted for this skill to be a PHEC level 6 requirement left no comments. The comment below from the short answer boxes present the debate surrounding endotracheal intubation from the Delphi study.

'I am not clear that endotracheal intubation in the context of its use pre-hospital without an anaesthetic is advantageous - supraglottic devices have the same or better outcomes'. (survey ID 3570073 Round 4).

'intubation paralysis post-ROSC and use of imaging (including ultrasound) should be desirable rather than essential for military L6. I do not believe that the absence of these skills would have a large effect on the capability as there are other ways of addressing the issue (iGEL/surgical airway) or the skills are rarely used (rocuronium). If these are made mandatory requirements they may be difficult to acquire and maintain to the satisfaction of the clinical governance leads. We want to ensure that the L6 concept is not "priced out of the market" by insisting on maintenance of rarely used skills. (survey ID 3562514 Round 4).

'I'd suggest removal of ET intubation. The training burden is high and the skill fade considerable. There's little evidence that intubation in arrest improves outcome and some

suggestions it makes it worse. We should be pushing SGAs unless drug assisted'. (survey ID3556385 Round 4).

Chest drain insertion

Chest drain insertion remained conflicted, with participants raising the requirement for this

procedure in different operational areas, further debating its requirement for military pre-

hospital care:

'Chest drains do not have a role in Military PHEC (survey ID 3572861 Round 4)'

'Very rare to need to insert a chest drain pre-hospitally especially with new chest drainage devices. Escharotomy is also very rare in the PHEC setting - this procedure is relatively simple however cannot be practised and relies on practitioners having gained surgical skills elsewhere; this would be very hard to consistently achieve at L6' (survey ID 3562514 Round 4).

However, other participants commented that a new technique might replace the need to

perform a chest drain and suggested:

'Chest drain can be supplemented at level 6 by thoracostomy and chest seal' (Survey ID 3577336 Round 4).

One theory for the consensus issue is that it could have resulted from the lack of

clarification on where this skill might be needed, for example, prolonged field care and

evacuation over land, air or sea. The absence of operational context could have resulted

in the variations seen in the participants' views. The parameters for when the skill might

be performed were left open-ended to avoid leading the participants towards consensus

on an item:

'I think that this should be Level 6 skill in the context of a military clinician - for loner transfers and transfers by fix wing aircraft this should be regarded as essential' (Survey ID 3570073 Round 4).

'A lot depends on timescales. If evacuation is rapid then some items are less important. If a prolonged field care situation exists then they might be' (Survey ID 3485956 Round 3).

eFAST (ultrasound)

In terms of pre-hospital imaging, there were a few participants who felt it was not a requirement for pre-hospital military practice, while others believed that the skill had utility for PHEC level 6 practice:

'eFAST is not a competence that is particularly useful for L6 and is very challenging to remain competent in. I would suggest that lung US to detect PTx in trauma and FEEL (focused echo in life support) is more appropriate. Exposure to ongoing training in multiple US indications is not currently amenable in UK practice' (Survey ID 3572861 Round 4).

'Use of imaging (including ultrasound) should be desirable rather than essential for military L6' (Survey 3562514 Round 4)

Clinical Exposure and Roles

Whilst the Delphi study was not designed to explore clinical exposure, experience and roles explicitly, one participant articulated concerns about the current issues with DMS personnel accessing clinical exposure and maintaining currency. These participant comments were only apparent in rounds 1 & 2. It is likely that the identical participants engaged in each round. Consequently, the issues they raised during rounds 1 and 2 were already addressed, and as a result, they opted not to reiterate them in rounds 3 and 4.

It is apparent from the below statement that the competencies outlined for PHEC practice should be achievable. However, it was felt that, in reality, it would be unrealistic:

'IN many of cases these qualities SHOULD be deliverable by L5-8 personnel but particularly at the L5 and also in many cases the L6 level these are dependent on the degree of clinical currency and experience. The reality is that in DMS personnel these are both lacking and so it is unlikely that these are all realistic aspirations. Clinical leadership is a good example' (Survey ID 3392605 Round 1).

Conflicting opinions on PHEC level 6 roles

The overall aims of the PhD were not divulged to participants in an attempt to mitigate professional bias around different roles involved in pre-hospital care. Despite this, short answer responses appeared to indicate the existence of bias in people's decision-making around the ability of 'in-hospital nurses' versus paramedics to perform the PHEC level 5 role, with evidence of views around professional dominance:

'Some of these questions may be answered different between a Pre-Hospital Paramedic compared to an in-hospital Nurse for Level 5 purposes' (Survey ID 3359028 Round 1).

From the short answer boxes, 1 participant commented that critical care paramedics should undertake PHEC level 6:

'I think the defence level 6 practitioner should mirror a Critical Care Paramedic (CCP) in the civilian sector' (Survey ID 3481231 Round 2).

Referring to a list of PHEC level 6 skills outlined in round 2, the following was raised, suggesting that GPs should be able to perform the suggested PHEC level 6 competencies:

'Should be the standard for all deployable GPs'. (Survey ID 3433593 Round 2)

6.8 Part C: Phase 2: Semi-structured Interviews

Lastly, to build from the Delphi results, additional questions around advanced skills and

procedures related to level 6 PHEC practice were asked during the semi-structured

interviews in Phase 2. Nine of the AP's and non-AP's took part in this question set. These

participants are coded in the thesis as:'AP1' 'AP2' for Advanced Practitioner, 'DR1' 'DR2'

for doctors, 'P1', 'P2' for paramedics and 'N1, 'N2'' to denote nurses. This section

presents the findings from the interview questions in reference to the non-consensus skills

remaining from the Delphi study to generate further data and explore why these PHEC

skills for level 6 practice remained conflicted.

Participants unanimously agreed during the Delphi study that APs working in PHEC should

perform sedation, independent blood administration, POCUS and advanced airway

management. This aspiration was further confirmed during the interviews. Furthermore,

participants commented that APs should have a similar scope of practice to an NHS CCP

if working at PHEC level 6. Additionally, skills such as managing musculoskeletal injuries

were mentioned as a requirement for military APs. Lastly, confliction in views remained

from the Delphi study concerning intubation and chest drain insertion. The responses

regarding these skills helped elaborate further on the findings and lack of consensus

during the Delphi phase of the study.

*"in terms of practical procedures, I think important key skills are the ability to administer
blood products, intravenous medication. Procedural sedation, I think it would be useful to
know, that, as to me it is a very discriminating skill that discriminates level six from level
five"* (DR3).

*"I would expect them to be able to manage musculoskeletal injury. Think about what the
common things are, particularly in the military environment, the management of heat
casualties. I think you probably need to have quite a heavier focus on environmental injury
and what we do in the civilian environment. And then some of the sort of underpinning
knowledge around the more benign presentations as well. So management of minor
injury, management of minor illness in order to be able to operate in a sort of forward*

environment where you're effectively trying to force generate rather than purely just deal with battle injury" (DR7).

Sedation

Most participants expressed that administering ketamine for sedation is a required skill for

an AP working in military PHEC. Participants felt that the additional skills associated with

sedation, such as advanced airway, monitoring and medicines management, were

required to perform the procedure safely. These extra skills were within an APs scope of

practice. However, one participant commented on the risk of laryngospasm associated

with ketamine sedation. It was felt this needed to be considered a risk if APs were

undertaking the procedure, as they cannot perform a PHEA to manage the complication of

laryngospasm. However, the risk of laryngospasm was considered rare when using

ketamine, and therefore risk versus benefit outweighed this complication.

"And there's a part of me that thinks that is sensible. But as I say, you have to have a risk and benefit analysis. Laryngospasm is really rare with Ketamine, when you do get it, most of the time, you can fix it without anaesthetic and there are huge benefits to it. So it's undoubtedly the right thing to do" (DR6)*.*
Intubation

From both sets of participants, conflicting views were raised regarding APs' ability to

perform intubation without drugs in military PHEC. Some of the APs commented that they

are already trained and are expected to perform the skill of intubation in their civilian

practice. Therefore, they felt it was an appropriate skill for military PHEC practice.

However, of note, the APs who were undertaking intubation could not perform a PHEA.

The intubation was performed during a cardiac arrest without drugs. However, in

managing post-cardiac arrest during a return of spontaneous circulation, some APs could

give anaesthetic medication. Muscle relaxants and sedation medication were

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administered to facilitate the patient to tolerate the endotracheal tube that had been

previously placed during a cardiac arrest without direct medical supervision.

"Yeah, I think in my current role, I'm expected to do an intubation without drugs on a cardiac arrest patient" (AP1)*.*

It was DR2's view that intubation sets an AP apart from a level 5 team in terms of bringing

an additional skill set for advanced airway management to a pre-hospital scene. It was felt

that this skill discriminates the AP apart from a team who have requested an AP to support

their management of a patient who needs advanced airway intervention beyond iGELs or

other airway devices.

"Yeah, 100% they should be trained to intubate. So they need to be able to intubate in a cardiac arrest, because otherwise, why, what do they bring to the party" (DR2)

However, some participants felt that intubation lacked assurance in terms of skill

maintenance. It was understood that the risk associated with not performing intubation

competently was high. Although it was stated as an "easy" skill to teach, the risk of skill

fade was significant. This was mainly due to ambulance services removing intubation as a

skill for paramedics and using iGELs in its place. Following the Airways 2 trial, participants

felt the use of iGELs now replaced the need to intubate; therefore, its indication was now

considered rare. Undertaking a surgical airway in the extremis was sufficient to "buy out

risk" associated with an intubation requirement. A surgical airway is a skill taught to a level

4 medic and, from a procedure point of view, is understood to be technically easier when

compared to intubation. However, participants felt it was often the decision to perform the

surgical airway that was the most problematic element which results in hesitation to

perform this rarely required procedure.

"So, again, I think that my preference, given the vast additional skills that I expect military practitioners to have is an appetite for risk, I would say No, I do not think it should be an assured skill set. What I think they should be good at is very competent at using iGELs, and also have a lower threshold for using a surgical airway" (DR1).

Some non-medical participants felt that intubation, since its removal from ambulance services, was now a "doctors only" skill. This issue was noted within the trust and personal relationships theme in chapter 6. However, from the medical participants, it was not mentioned as a "doctor-only skill". From DR3's perspective, there were several advantages to having a "CCP" perform the procedure.

"I actually don't really have a problem with it because I regularly let critical care paramedics do the tube for an RSI. Because sometimes I prefer the situational awareness of being on the drug management, I would rather keep that and let the intubation go, it's not really a matter of who puts the tube down, I think it's more a matter of the next steps, you know, putting the tube down is actually the easy bit, I think" (DR3).

Chest Drain

In terms of chest drain insertion, participants remained conflicted on its role within PHEC, both civilian and military. Some APs noted that it is already included within their training specifically outlined in the RCEM ACP curriculum. However, APs working as CCPs hadn't been trained to undertake this procedure. Participants could see a role in training APs to undertake chest drains for military PHEC, specifically for a prolonged field care scenario. The example given was that a chest drain would be required for working at altitude or for a recurrent pneumothorax.

"I mean, the short answer is yes. I think a military level six practitioner should be able to perform a chest drain. I will just expand on that, I think that the time and occasion for level six practitioners in the UK is so close to zero, it's probably not worth it, probably not worth training and maintaining that skill set. But in a military context, it very much is because you will likely hold patients for longer. And you are likely to transport people by aircraft. And you know, it is an important part of the management of a patient beyond the first 90 minutes or so to somebodys care. So yes, I think its important" (DR5).

Participants that remained conflicted over chest drain insertion considered it a high-risk procedure in terms of sterility in the field and maintenance of competence for a skill rarely required. In addition, some participants mentioned new devices that were in the process of being procured by the DMS that will replace chest drains for remote working. It was envisaged that a level 5 clinician could insert the new devices for the management of a pneumothorax.

"I don't think chest drains should exist in pre-hospital emergency care. I think it should only be used very, very occasionally in pre-hospital emergency medicine" (DR2).

Point of Care Ultrasound (POCUS)

In relation to APs being trained to undertake POCUS within a PHEC environment, the vast majority of participants, both AP and non-AP cohorts, were in favour. It was felt that POCUS assists with decision-making and diagnosis. Participants suggested APs should be trained using a nationally recognised curriculum such as RCEM ACP training and maintain their competence through a logbook. Indeed some APs, both ACPs and CCPs, were following this method of training and using the skill in their civilian role.

"I think that this is a key part of the decision-making process. And I think key clinical decision making on scene are things like managing cardiac arrests, looking for things like cardiac motion can add into that decision-making process" (DR1).

"Yeah, absolutely. I don't think that's at all controversial area, as ultrasound, as an ultrasound fan. Erm so in the areas that I would focus on would be the focus ECHO in cardiac arrest, FAST lung scanning, and vascular access. And in the military population, the requirements for abdominal scanning for aortic aneurysms is relatively limited" (DR7).

Prescribing versus PGD

For the majority of participants, APs having the ability to prescribe medication was recognised as a core skill to achieve autonomous practice. It was felt that prescribing offers flexibility over a "restrictive" PGD and was a requirement for a military AP. It was considered safer in terms of medicine management, providing assurance that medication could be tailored to patient needs, as not all patients neatly fit into PGDs. AP5 felt that PGDs had evolved into documents that facilitate medication administration outside of their original purpose.

"....so the problem with using PGDs for critical care work is a complete "bastardization" of the PGD and what it was designed to do. And really, we should get on and just do prescribing because it's very difficult to describe a patient sufficiently in a PGD" (AP5).

"being able to prescribe not having to rely on a PGD. Has the benefit of being much more flexible in the pre-hospital environment" (DR4).

6.9 Conclusion

Using a Delphi study technique, an iterative, anonymised electronic survey was administered in four rounds. Purposeful sampling was used to select 26 Defence subject matter experts. The instrument used open-ended questions, Likert scales and short answer boxes to ascertain which of the FPHC competencies are appropriate for PHEC level 6 care. For each round, competencies that achieved 70% consensus were considered PHEC level 6. Round 1-4 reviewed a total of 205 competencies of which 200 reached 69% consensus and 3 items were confirmed as level 7-8. From the short answer responses 4 items did not reach consensus, opinions remain conflicted. During the analysis, it became apparent there were conflicting competencies that failed to achieve

consensus, including chest drain insertion, endotracheal intubation, escharotomies, and POCUS. This lack of agreement emphasises the complexity surrounding certain advanced skills related to PHEC Level 6.

In addition, there were concerns raised from the qualitative comments in regard to the maintenance of advanced skills at PHEC Level 6 and the risk of skill fade. These included; issues relating to training and weighing up the balance between risk and benefit for patients, and which of the skills are required for operations. Further challenges were commented upon, including how to attain the additional skill set with the existing clinical placements, inadequacies in training programmes, and the level of support. It appears likely that, due to the unique nature of military PHEC work, there could be justification for any of the above skills to be included in an AP scope of practice. However, it became clear that a critical consideration is in striking a balance between the calculation of patient risk versus the benefit. Furthermore, the need for adequate training, operational requirements, and the maintenance of competence are all additional considerations if the DMS wants to introduce APs.

In conclusion, this Delphi study reached 69% consensus on the competencies for PHEC level 6 care. It should be noted that if consensus is not reached, this may still be regarded as a valid and valuable finding (Hsu and Sandford, 2007). From the short answer (open text) boxes, the data collected has identified a range of themes that have opened the narrative on various issues associated with PHEC level 6 practice. These findings were explored further in the interviews conducted in phase 2. Presented in part C (Phase 2 interviews) of this chapter which built on the Delphi findings, found there were specific clinical and non-clinical skills relating to PHEC level 6 care for military APs (RQ1). These included sedation, independent blood administration, ultrasound and advanced airway

management. Furthermore, participants felt that APs skills should extend to critical care retrieval and management of musculoskeletal injuries. These skills would be advantageous for APs deployed on remote operations. In addition, themes relating to skills, roles, AP training, and support need further investigation. Role conflict and dominance emerged as significant findings from the short answer responses. Tensions were noted between nurses and paramedics, as well as GPs. These tensions revolved around the central question of which role should undertake the primary responsibility for performing and recognising PHEC Level 6 practice.

In the subsequent phase of this PhD, the focus of the Delphi study was extended in the interview phase to explore the issues related to the conflicted competencies concerning their appropriateness for Level 6 practice and role for military PHEC. The next phase aims to explore the complexities surrounding topics raised from the qualitative section of the Delphi study, for example, concerns about skill fade and exploring strategies and interventions to manage and mitigate this risk. Phase 2 will explore the training pathways of existing APs to understand how competence is retained, consider current clinical exposures, and if APs could deliver PHEC level 6 care for future deployments. By doing so, the study aims to gain a comprehensive understanding of the various aspects influencing the development of military AP practice for PHEC operations.

Chapter 7: Results from the Semi-Structured Interviews

7.1 Introduction

This chapter will present the qualitative analysis from Phase 2 of the research. The design was based on conducting semi-structured interviews to explore the current work and practices of military APs (research question 2) and the experiences and perceptions of military pre-hospital personnel of the AP role (research question 3). These interviews aimed to explore a military multi-disciplinary team's understanding of the AP role. The interviews from this group investigated their expectations of the AP role and if participants could see a benefit from an AP in military PHEC. This research phase aims to provide completeness in this mixed methods study to address the research questions comprehensively.

Demographic characteristics of participants

The study recruited 10 AP participants, and these are coded as 'AP1', 'AP2' and so on. In total, 12 non-AP participants were interviewed. For coding, these participants are presented as: 'DR' for doctors, 'P' for paramedics and 'N' to denote nurses.

Demographic data such as role, deployment history, and additional skills training were collected prior to the interviews. Collecting demographic data for a qualitative study is essential to understand participants' characteristics and the context in which they provide their responses. However, collecting only what is required for the research is an important consideration, as additional unrelated questions can put pressure on participants from an ethical stance (Adeoye-Olatunde & Olenik, 2021).

Nonetheless, understanding the demographics and background of the participants helped to provide an enhanced insight into their answers and aided in improving the overall quality of the interview. Additionally, asking these closed questions enables a line of "warm-up questions" prior to the interview to promote rapport and provide a comfortable setting.

The participants' demographic characteristics are presented in tables 7.1 (AP) and 7.2 (Non-AP). The gender of each participant is not mentioned as it was felt not to influence the questions asked. Most AP participants were nurses due to the DMS not training paramedics in Advanced Practice at the time of the interviews; therefore, all of the paramedic APs were reservists (see table 7.1).

Table 7.1 AP Participants Demographic characteristics

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, TELLIC. British Army Training Unit Kenya (BATUK)	
AP 2	Paramedic	DipIMC, PG Dip Advanced Practice	Reserve	CCP Air Ambulance	BATUK and HERRICK MERT	Sedation Course - independently sedate. Surgical Skills Course - independently perform thorocostomies and surgical airway. RCEM Level 1 Ultrasound Training ALS and APLS course.
AP 3	Nurse	PG Dip Advanced Practice	Reg	ACP EM/PHEC	MERT HERRICK and BATUK	PHEC university course
AP 4	Nurse	MSc Advanced Clinical Practice	Reserve	ACP EM/PHEC	MERT BATUK	
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	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	MERT BATUK	
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

For Non-AP participants, the majority of the participants were doctors (see table 7.2), reflecting the Defence PHEC Specialty board sampling frame, which consists mainly of doctors. However, despite the bias towards the doctor participants, there was heterogeneity across the PHEC levels, in which there was equal representation across levels 5, 7 and 8. Level 6 is not included as it is not formally defined and, therefore, not represented on the Defence PHEC Specialty board.

Table 7.2 Non-AP Participant Demographics

Number	Role	Reg or reserve	MERT
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

7.2 Interview findings

This section presents the thematic analysis of the interviews. Three main themes were identified (with a set of sub-themes). Presented in theme 1; Military Advanced practice current work, support and training. Theme 2 focuses on working relationships with APs

entitled trust and personal relationships. Lastly, theme 3 is the future role of military APs. These themes and their sub-themes are summarised in table 7.3 and then the analysis is presented in this chapter in turn.

Table 7.3 Themes and sub-themes of the interviews

Main Themes	Theme Title	Sub Themes
Theme 1	The current work and career management of military Advanced Practice	*Current Work and Characteristics of Military Advanced Practice* *Military Training* *Effectiveness of Military AP Training Pathways and Strategic Gaps in military AP development* *Clinical exposure for APs in deployed settings* *Ongoing support for the role* *Career development and pathways for aspiring military APs*
Theme 2	Trust and Personal Relationships within multi-professional teams	*Perceptions of Trustworthiness* *Role Understanding and professional identity* *Hierarchy and Tribes within professional groups and military rank*
Theme 3	Future role of military APs	*The value of the AP role in deployment* *Challenges for operational APs*

7.3 Theme 1: The current work and career management of military Advanced Practice

This first theme presents the current work of military APs and their career management. It is understood that due to a lack of overarching strategy surrounding the military AP role this has led to several historical issues identified, which were associated with the career management of APs. Career management refers to peacetime postings, deployments, and management of appraisals and promotion boards. Sub-themes included; current work

and characteristics of military advanced practice, military training, effectiveness of military

AP training pathways and strategic gaps in military AP development, clinical exposure for

APs in deployed settings, ongoing support for the role, career development and pathways

for aspiring military APs. This section will present the findings from each sub-theme that

contributed to the overarching central theme to explore current work and career

management of military Advanced Practice.

Current Work and Characteristics of Military Advanced Practice

All participants were asked about their understanding of AP roles and their own current

role. The non-AP participants appeared to understand the nature of advanced practice

roles. It was apparent that their knowledge was contextually drawn from their experience

working with civilian APs in the NHS. The AP role was perceived by participants to have

originated from either nursing or paramedic backgrounds and then supplemented with

additional training. Regarding military APs, all participants felt that the role was linked to

extensive experience from military and core clinical role perspectives, complemented with

additional academic training.

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

Collectively, participants viewed their NHS experience working with APs as positive,

providing tangible benefits for patients and NHS workforces. APs within the NHS were

regarded as providing improved provision for patient care. Civilian APs were considered

cost-saving relative to doctors and had been a critical enabler for workforces to meet the

demand of patients from the NHS. Participants perceived that there was an opportunity for

an AP to bring different perspectives and insights to patient care during deployments.

Some participants felt APs provide diversity to the workforce by offering opinions on

patient assessments from a background that is not exclusively medical. APs working with

doctors provide patients with a multifaceted approach to their care, combining aspects of

medical training complemented with experience from a nursing or paramedic background.

"This is all to do with that diverse mindset. They're trained differently. They bring a
different background and have different ideas about patient care, which is really helpful"
(DR3).

It was understood that the additional academic training and experience facilitated a level of

autonomous working that superseded their previous role. For both groups of participants,

"autonomy" was considered the defining concept of advanced clinical practice. Autonomy

was described as the ability to undertake independent decisions on patient care and take

overall responsibility in care planning by diagnosing, treating and prescribing medications.

"I think it's more about independently seeing patients and having the ability to make clinical
decisions about these patients on a routine basis, not only about what you think is wrong
with them, about in the instigation of treatment management, and either discharge" (AP1)

The ability to prescribe medications allowed an AP to operate further in an autonomous

capacity. For some participants, a prescribing qualification defined an AP in terms of full

independent practice. Having the ability to prescribe was advantageous in a military

environment, particularly in remote locations where a nurse/paramedic may not have

access to a doctor to prescribe medications for them. Participants considered the

additional autonomous skills, such as prescribing, set their role apart from that of a

nurse/paramedic. Some participants felt that an AP was more comparable to a junior

doctor in their ability to act autonomously and at the same skill level.

"So my understanding of advanced practice roles sits in both paramedic and nursing cadres to have the ability to act autonomously or at a level outside their current remit, including the ability to prescribe and dispense medications but also to act autonomously, in isolated locations in a military setting but in civilian setting also, to act in isolation, almost akin to a junior team member of the doctoring cadre" (DR4).

Clinical decision-making was perceived as a fundamental requirement for advanced clinical practice and a marker of autonomy. From the AP group, the additional training APs receive seemed to empower the individual to undertake a level of decision-making that couldn't be achieved in their previous core role. This was viewed as beneficial for isolation working, multiple or complex patient cases whilst deployed.

"the advanced practitioner would have the experience to work collectively with the doctor for advanced decision making and, in those roles, where the level eight may not have so much pre-hospital experience as a collective team, it may be of benefit to both" (DR10).

A similar thread from each participant is that AP roles provided an enhanced level of clinical leadership and greater autonomy. It could provide mentorship with junior members of the clinical team, inclusive of doctors, nurses and paramedics.
It was felt that this would be useful for managing the complexity associated with either a pre-hospital scene or patient care. Advanced practice training combined with clinical experience was viewed as delivering a higher level of clinical leadership when compared to the APs previous core role.

"But I think above all, what we bring to the party, being an experienced pre-hospital clinician where most of the time we don't have to use the skills, we turn up, and we have a fresh set of eyes. To what can be chaotic scenes and we bring a leadership element to it. Yeah, making a calm from the chaos is probably what we do most" (AP10).

Military AP Training

All APs were undertaking or had completed a master's in advanced clinical Practice. The academic programme was studied alongside clinical postings and lasted for a minimum of 3 years.

"We have been put on a MSc pathway and concurrently in advanced clinical practice and concurrently to that have been signed off with being able to do lots of advanced skills" (AP2).

However, APs reported that the training programme was not fully protected from military taskings. During training APs were still at risk of being deployed overseas on exercises or operations. In addition, APs were not safeguarded from essential duties such as specific military training, resulting in interruptions in AP training. APs reported finding a compromise with their chain of command to facilitate study time and balance the demands of military duties. AP9 reports being remotely located from their main posting for their clinical placement time during training. It was felt by their line management that the 3-year training pathway would not allow for any other military-related activity. Therefore, as a local arrangement, they were "left alone". This agreement with the AP9 chain of command seemed to protect the AP from military taskings within their unit and appeared to be negotiated informally. It was unclear if this positively impacted training or isolated the AP. For regular serving military APs, there was not a standardised AP training pathway, resulting in training time being continually negotiated with their chain of command at JHG units and agreed upon via informal arrangements with their line managers.

"I've kind of been left here to get on with it. Whether that's because I am doing a 3yrs master's and they have left me alone to get on with it. Like I said, it being quite a new concept and there isn't that many in the military, and with headquarters being remotely located" (AP9).

Some in-hospital AP participants were undertaking ACP credentialing with the Royal

College of Emergency Medicine (RCEM). The opportunity to credential was often dictated

by the NHS trusts they were working in, as this was standard practice for civilian APs at

that hospital. This was not a mandated requirement for military APs by the DMS. Of the

AP participants completing the RCEM pathway, it was felt that credentialing offered

standardisation and credibility as an ACP. This was useful as it was recognised when APs

were posted to different Hospital Trusts, thus facilitating a professional identity in this

setting. APs reported that upon completing the RCEM ACP training, they could present

their portfolio to the department managers to practise at the same level. Some military

APs felt credentialing after training was essential to their post-academic consolidation

phase.

"I see credentialing with RCEM as fulfilling because, you know, that everyone is capable of meeting that same standard" (AP6).

"so, I'm looking at the RCEM credentialing and so again, because I've done my theory. The practical aspect needs consolidating more on the practitioner side, I couldn't go out there and say yeah I'm an ACP" (AP4).

Non-AP participants varied in their views about AP training. DR6 felt the AP pathway did

not offer the same level of depth compared to medical school for doctors. An example

given was the lack of teaching about pathophysiology. DR6 recalls a case-based

discussion with an ACP and identified gaps in knowledge. DR6 felt this was likely related

to topics not covered within the ACP's training.

"think there is some limitation, by the level, it's by the background knowledge of pathophysiology that concerns, it's just not as deep. So, I did a CBD (case based discussion) with an ACP in the hospital a couple of weeks ago. And it was a bit of a disaster, because this stuff we were talking about, they had absolutely no grasp of what it was. So, it was a patient that presented in the emergency department, but it was talking about some of the wider issues behind their presenting complaints. Which, because it

wasn't a direct emergency thing that wasn't where their experience was. So, they didn't have the same depth of knowledge. And it affected their emergency management. Because whilst they, on this occasion got the right diagnosis, they didn't have the depth of knowledge to think of what the other causes could it have been. So, I think that's a limitation as well" (DR6).

It was felt from the AP training that some of the taught elements needed to be updated and modernised. DR6 commented that patient assessment taught to APs concentrated on "traditional" methods, such as teaching practical aspects in the classroom from textbooks. This is opposed to the practical application of patient assessment guided by learner enquiry supported by mentorship currently being conducted in today's clinical practice. In contrast, DR1 felt that AP training had the right balance of experience and theory. DR1 considered that medical school rotations to other specialities, such as surgery and medicine, provided an in-depth foundation. However, as APs work in one speciality during their training and qualifying in-depth rotations would not be required. It was felt that the role builds on current experience obtained from the APs core role (nurse or paramedic) and the additional training up-skills to an AP. This approach to AP training provided a good balance of preparation to become an AP for that specific area.

"They combine, you know, the best elements or the most important elements of the nursing side, retain that sort of mindset, and then introduce the sort of, I guess, the most pertinent elements of the medical training, you know, that there is not that quite broad-based background, but that's actually quite good thing. You know, having done rotations in urology and haematology, etc, which many of our doctors have done, gives you a much broader width of knowledge. But actually, that's pretty irrelevant when you're working in a particular speciality" (DR1).

AP participants identified that pauses in training were a challenge. APs reported that their training had been interrupted due to operational taskings or postings and that most of their training time was not formally protected from other military taskings, there were concerns raised in relation to skill fade. Furthermore, there was a degree of variability between each

of the three services concerning which elements of the AP course were given protected

status. For each of the services, a trainee AP can pick a year of the course to be

protected from military taskings. AP participants commented that being pulled from

training to undertake military duties impacts clinical practice. This left them feeling less

confident after a pause in training to undertake pre-deployment taskings.

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

APs felt there needed to be a balance in terms of undertaking clinical training,

deployments and having military support. In addition, there seemed to be varying levels of

local unit support regarding clinical mentorship and "on-the-job" training. Some APs

reported a strong sense of investment from their consultant mentors, whereas others felt,

at times, unsupervised.

"Our training is pretty good at the moment. It's quite supportive. And actually, we've got some newer consultants that are actually taking over as consultant mentors, actually, our newer consultants are keen to push us even further to be honest with you" (AP7).

It was noted that having a military consultant instead of a civilian in the role of clinical

mentor was advantageous. APs felt that a military consultant had a good understanding of

the AP's military role and was more willing to allow the AP to practise skills.

"Yes. In fact, on this deployment, I have had a job where my NHS skills as an advanced practitioner would have been utilised in this particular case. However, because I wasn't signed off as a level six practitioner I wasn't able to use those skills autonomously. However, we were able to use the supervision and guidance of an MO that was around. That was able to assist us in the sedation of a child who had a major trauma" (AP10).

Both military consultants and APs have a shared understanding of the military context

where they work. This military mentorship offered a good balance of support, providing

relatability and understanding of their military role for deployments. Although the AP and

military consultant are different roles, both have a common purpose of being allied with

military service, often with previous deployment history, sometimes on the same

detachment. This resulted in a bond and a strong working relationship.

"I think that military consultants working in the same environment as you are 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" (AP6).

In addition, due to the limited availability of pre-hospital placements for nurses, it was

highlighted that training nurses to undertake an AP role in pre-hospital care might be

challenging. It was felt that there is no equivalent role recognised at a national civilian

level for nurses to become an AP in pre-hospital care. However, there are a minority of

local examples of nurses undertaking AP roles in civilian pre-hospital care.

"I don't think in the civilian setting, aside from critical care practitioners, paramedics, there isn't a sort of nurse pathway recognised that does advanced practice in pre-hospital care. That is a recognised sort of pathway of national or regional scale. So actually, it's pretty difficult to plough that in the way that defence medical services set up, because we're so heavily reliant on the NHS for our training. And unless that training exists in the NHS, it's really difficult to implement it, and there just isn't a will to implement it from a Defence point of view" (DR2).

Effectiveness of military AP training pathways and strategic gaps in AP development

In terms of clinical practice, multiple issues were highlighted as a concern by both groups

of participants during and after AP training which mainly related to lack of strategy

underpinning the AP career development. DR2 and AP5 expressed views specifically

concerning military paramedics' training. The majority of 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 a clinical

placement. The term "answering phones" in the below quote refers to desk-based administrative tasks required in their non-clinical posts. A military paramedics' annual mandated clinical time is 36 shifts. It was felt that the current level of clinical exposure for military paramedics would not be suitable to prepare for the AP role, unless there was a strategic change.

DR2 called for a change in policy regarding current paramedic training with an increase and an 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. This would serve to protect paramedics' training, reduce skill fade and provide a career pathway, ensuring they remain working in full-time clinical practice.

For reservist APs, their clinical exposure and experience before undertaking the role was considered superior when compared to regular paramedics. Reservist nurses and paramedics routinely work in full-time clinical practice, undertaking their military service on a part-time basis unless deployed. Therefore, some reservists suggested that their clinical experience is greater when compared to regular serving nurses or paramedics. AP5 describes their clinical background, where a vast majority of time has been spent "lone" working, reflecting their autonomy.

"I've been, prior to doing the AP role, I've been in the ambulance service for 15 years done a bit of HEMS 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" (AP5).

Achieving the academic component of AP training was viewed as feasible. However, the clinical placements and ongoing exposure post-training were considered challenging to achieve. Participants perceived that, after completion of AP training, consolidation and

maintenance of skills were not outlined in a specific AP career strategy. The lack of

strategy presented challenges for career management of APs, for both line management

and for individuals. At the time of the interviews, there was no available strategy on

military advanced practitioners in pre-hospital care. Participants felt the absence of a

strategy generated tension and stagnated AP development. An explicit, formalised AP

strategy was viewed as a key enabler to protect military AP's clinical time and training

needs.

"I think we certainly, certainly from my branch, we've got people who are really highly trained. We're pushing towards having people that are able to deliver at this level. Actually, we just need strategic oversight to support that development" (AP1).

N1, AP1, AP6 noted the absence of a strategy caused confusion. The next step for AP

development would be to develop and provide an AP career strategy to enable people to

be trained and supported to deliver against an identified capability, with "buy in" for all

three services, Army, Navy and RAF.

"There wasn't the strategy in the policy and it wasn't defined, it is not articulated" (N1).

"Things that restrict us currently or lack of policy that supports is that is it embryonic" (AP1)

"There's a lack of understanding of it and the policies are not there and the policy is just stating or articulating the requirement and what we're able to deliver just isn't there at the moment" (AP6)

The lack of an AP strategy resulted in a lack of standardisation and variability reflected in

job plans. AP2 considers that the absence of an AP formal consolidation pathway results

in delays in development and a lack of assurance in terms of skill maintenance when

deploying an AP post-training.

"there needs to be the consolidation of clinical practice, not just the academic side of it" (AP2).

Following AP training, AP participants commented on the unrealistic prospect of

maintaining AP currency when posted to a non-clinical role, resulting in skill fade. Due to

the absence of an AP strategy, military APs could be posted to either non-clinical or

clinical posts. When posted to non-clinical posts, it is a mandatory requirement to maintain

a minimum level of clinical practice. The current mandated clinical time for nurses who are

posted outside of a hospital unit is the completion of 80 hours bi-annually. However,

collectively amongst APs, the mandated 80 hours of clinical time is considered not

sufficient to maintain currency as a nurse or an AP. There is no separate strategy

regarding the minimum number of clinical hours required for APs. The demands of the

non-clinical roles may not allow for protected time to maintain a clinical practice at an

advanced level. A specific AP strategy was raised as a key requirement.

"if you then put people part-time, and let's face it, or get put into a staff job, we all know what the demands are like and you actually very rarely. It's the first thing to get chopped is your clinical time, really, the demands of staff work and being on a desk job. And doing what some people do like one week, every however many months isn't sufficient to sort of keep, keep your hand in you have to be there. And you have to be doing it, you have to be doing the job (clinical role)" (AP6).

"Well one, I'm not, I am not on a practitioner pathway. And so there's not that many pids (assigned AP jobs), so it's finding the places that know you and that will support that. But then the problem is you just get there, and just get that (hospital AP role) you then get pulled to somewhere else (deployment, course)" (AP4)

"I want to try and get down (from HQ to the clinical department) and try to do the minimum hours, but then you're doing a Master's, how are you really then doing your minimum hours? Are you really at that right skill level to then be able to do it on deployments or to do it elsewhere? As a practitioner, surely you really need to remain full-time clinical and be able to wherever you are posted to practise as a practitioner" (AP9)

AP4 gives a personal example of when they were posted to a role involving reduced

patient-facing time which affected their confidence. Access to clinical time whilst working

full-time on an Aeromed Squadron was highlighted as an issue to maintain clinical

currency. During their posting onto the squadron, AP4 was held in a readiness state that made it difficult to undertake more than the minimum of 80 hours of mandated clinical practice. In between on-call periods, they were undertaking medical repatriations worldwide, which would involve long hours out of the country and resulted in skill fade.

"So, obviously I went to aeromed. So again, aeromed to do my 80 clinical hours but 80 clinical hours is not enough, even in ED. Trying to keep your skills up. You do deskill a lot. And it's a confidence factor" (AP4).

AP6 shares the same concern for maintaining clinical skills after AP training. A collective view among participants was that the military seems to consider a "course equals competence", neglecting the consolidation of training with clinical practice and support, resulting in skill fade.

"So yes, caveat that with people need to be given the experience and the time to make sure that they are still current and practising these skills, because it's like everything else that if you don't use it you lose it really, and I suppose that's my concern, we still as military have this obsession with it, course equals competence, and we know that it doesn't. So it's all very well training people to do this, but they need to be given a chance to practise it" (AP6).

AP2 compared the role of a military AP to a doctors' clinical outputs and that there was a difference in clinical expectations between both roles. It was felt that a doctor's role was more understood and translated to full-time clinical practice, compared to an AP where their clinical hours were not recognised in the same way and, therefore, not protected. AP2 further explained that during the consolidation of AP training, the civilian and military equivalent AP roles had different expectations of the number of clinical hours required. For civilian APs, consolidation was considered as an automatic phase of their training resulting in full-time clinical practice; however, for military APs, this was viewed as optional, and that other military taskings would often take priority.

"Yeah I think so, you know, without sort of wanting to keep banging on the same bit, doctors in the military follow the civilian pathway, there's no special difference, your military doctor you don't have to do that module. And and quite rightly that's that you know, a doctor is a doctor. And so yet nurses and paramedics in the military, you get like just do this module, but don't bother consolidating it. I'm not sure, you would not be allowed to happen in civilian practice or when you went to get the next job. So you've done your advanced practice module, but you've not seen a patient in a year, you'll never get a job, but yet in the military, it seems okay to post people in" (AP2).

It became apparent during the interviews that the absence of a career pathway underpinned with an AP strategy resulted in the misemployment of military APs after completion of training. Some APs had been posted into non-clinical posts such as instructing or staff roles after their training. There is a need for clinical-facing posts throughout an APs career and postings to non-clinical areas could stagnate development and onward progression as a qualified AP.

"career pathways that allow you to remain developed and in a clinical and deployed space without the requirement to drive a desk somewhere to tick that staff box" (AP3).

Clinical exposure for APs in deployed settings

Both groups of participants felt that APs deployed in military pre-hospital care and in-hospital should be working in each of these areas to maintain clinical skills before deploying. This is a challenge for military paramedics who do not work in hospitals and with a minority of military pre-hospital nurses who have the opportunity to work in the pre-hospital environment. There were strong views that if a deployed role was in pre-hospital care, when not deployed, a clinical placement should be arranged in either pre-hospital or in-hospital to maintain skills in that area. The skills required for both pre-hospital and in-hospital settings have substantial overlap, although the environments are different. A pre-hospital placement outside of operations provides clinicians with lone working skills working within the elements, offering enhanced decision-making when compared to

working in a hospital. These skills help maintain and build on working practices required

for the austere environments often found in overseas deployments such as in Kenya or the

Middle East.

"yeah I think it's important that, you know, if you're working in both areas that you need to do an advanced practice level, I think, to really to fully understand the two environments" (DR7).

"We need proper clinical placements that will support people having a competency but also maintaining it" (DR3).

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, therefore had no professional identity as an

AP. During the deployments, the AP's skill sets were called upon to assess and treat

patients. It was apparent that being trained to a higher level and then deployed in a role

as a nurse or paramedic blurred the lines of practice and identity. Practising beyond their

deployed role (nurse or paramedic) as an AP without the appropriate clinical governance

exposed them to possible litigation. For example, prescribing medication when deployed

without a non-medical prescribing policy left them unsupported if there was an error.

"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" (AP1).

"We were told that a significant eye injury was in the middle of the night, the patient was flown off the training area because that was the safest option for the patient. And at the handover point, halfway down where I was going to take over the patient's care, and I'd been able to get some updates in flight, and the patient didn't sound like he got a significant eye injury. And it sounded like he possibly had a viral or bacterial infection in the eye. So actually, instead of flying him on to the hospital, I was able to see that patient, assess, identify that they probably had viral conjunctivitis rather than significant eye injury and that he could be treated within the primary healthcare facility and bedded down. And, and whilst that seems like a relatively simple clinical decision, actually to fly the patient at night puts a significant risk on the aircraft significant risk, flying somebody who actually

didn't need to be flown to hospital and could be treated in an in another healthcare facility" (AP1)*.*

The above example from AP1 prevented the unnecessary use of the helicopter, which freed up the asset for time-critical patients. This resulted in saving costs and not flying the patient at night, which carries a higher risk. DR1 describes deploying with a reservist ANP in a role 1 environment. In their experience, the ANP could triage, see and treat patients independently and relieve some of the workloads from DR1. DR1 was the only medical Officer deployed to the treatment facility in the situation described below.

"I deployed with an advanced nurse practitioner, who again made a very great contribution" … "So having an advanced practitioner there, who was able to clerk or triage patients late at night, made a big difference if they were on call, so we're able to split some of the workload. And if they were actually on duty overnight, they were able to mitigate some of that" (DR1).

During the Afghanistan conflict, DR4 describes working with Danish ANPs. The Danish ANPs were deployed instead of doctors, working in a role akin to a General Duty Medical Officer (GDMO). The civilian equivalent of a GDMO is a pre-speciality junior doctor. Danish ANPs were predominantly deployed at the rank of Major through to Colonel.

"Some deployed roles in the past, including Danish advanced nurse practitioners in the past, who came out instead of the doctors which is quite interesting part as I came as a GDMO" (DR4).

DR4 found the Danish ANPs to have an extensive nursing and military background, which superseded their medical experience. The Danish ANPs were placed higher within the medical and military hierarchy. They were often deployed in a military leadership and mentorship role, supporting medics and their team, flipping the traditional UK model of a medical-led team. However, it was noted that they were less "hands-on" with patients from a medical point of view.

It became apparent that striking a balance between clinical and military leadership roles for senior clinicians presents a challenge for both doctors and APs. DR3 describes deploying with a Military Nurse Practitioner in Oman who was working in a role normally performed by a Regimental Medical Officer. However, there remained confusion concerning role definition as to whether this was considered an AP or specialist nurse role.

"So we had MMP (military nurse practitioner)deployed with me, in Oman, in fulfilling sort of traditional RMO (Regimental Medical Officer) roles. So I don't know if they strictly fall into the definition of advanced practice, because they are unique to the military, they are not RCEM ACPs. They fall into that advanced price bracket to an extent, don't they?" (DR3).

Although there were a few examples of international APs or nurses with enhanced skills who had deployed, there were no formal examples of UK APs working in a specific operational role. However, some may argue that a Military Nurse Practitioner could be considered an AP. With no formal definition of the Military Nurse Practitioner role, ambiguity remains. Nurses or paramedics trained as APs were deployed in a PHEC capacity and gave examples of where they had used their enhanced skills for patient benefit. Predominantly this was seen in nurse/paramedic deployment as a level 5 practitioner in British Army Training Unit Kenya who coincidentally were trained as APs.

Ongoing support for the role

Both groups of participants noted that ongoing support for the AP role required an AP strategy to be formulated. The lack of strategy regarding career pathways was highlighted from a non-AP point as a challenge. Some participants felt they were unable to help provide career advice for military nurses or paramedics aspiring to become APs. They could see the "end product" (which was qualifying as an AP); however, the process to

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guide them to become an AP was unclear. DR4 felt this was because they were unaware

of a formal AP military pathway.

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

Despite the absence of a strategy, most military APs working in clinical postings reported

good support from their immediate line managers. From AP7 and AP8, their line

management could see the benefit of their training and wanted to utilise their additional

skills within their squadron.

"…think so far, my 1RO (line manager reporting appraisal officer) and my 2RO (second appraisal reporting officer) have been massively supportive, and really keen for me to bring those skills into the squadron and start utilising them more within the squadron" (AP7).
"I had a DOCN (deputy officer commanding nursing), who was very, very supportive and after a chat with her regards what I wanted to do, she was very supportive" (AP8).

In addition to line management support, a strong and cohesive department with an

understanding of the AP role and their developmental needs was reported by both groups

of participants as important. A supportive team who valued their contribution could

positively impact the AP as an individual.

"Having them properly supported and working in a team, who has a clear understanding of what their developmental needs are. And then having a team that, you know, appreciates what they bring to the party as it were" (DR3).

"So, I think what helps support roles, definitely a really supportive department" (AP8).

Career development and pathways for aspiring military APs

Despite local support from line management, combined with a strong clinical team, the absence of an AP strategy that provides guidance for line managers on the AP role to be able to outline the AP requirements in a job plan was considered vital. The absence of an AP strategy resulted in the AP being misemployed in non-clinical roles. The job plan was necessary to protect training needs, clinical placements and military duties. For doctors, a military job plan is well established; however, for APs, this has been introduced in the last 5 years. APs supported the use of a job plan as it offered protection for their clinical development.

Despite job plans being an annual mandatory requirement, some APs had variations in their job plans. APs reported a well-balanced job plan whilst others were concerned that certain clinical postings may not support their proposed job plan, as they felt the hierarchy in that unit did not understand the AP role.

"I am really lucky as I have an amazing job plan at the moment" (AP6).

"possibly job plans in the pids (postings) that you are put in sometimes can limit it" (AP8).

"So as advanced practitioners, we need to have a similar model where practitioners are educated to master's level, and they have things like advance history taking, non-medical prescribing, diagnostic reasoning, but they have to have job role that allows them to flourish and develop their clinical decision-making capability, be that in emergency medicine or in the pre-hospital space, and that's similar to the roles I have now" (AP1).

From DR6, it was felt that a job plan can only provide some of the work hours required for an APs development and that there needed to be ownership for personal development from the AP to undertake work related to AP development in their own time. However, there was debate as to whether this was a "healthy" approach to an individual's workload to complete personal development outside of work time.

"The CCPs have time in their job plan to do a Master's, additional work, but often get quite trade unionist about doing work in their own time. Which means, which I think is a contrast to most doctors as in, it is just an accepted part of the job, that you have to do stuff in your own time. So I think, some could argue it's a much healthier attitude that I'm only going to be working in work time, but it does limit development. And it's not universal by any means. But there are certainly some, some that do. And I've, I've never seen that in a doctor because you end up having to do, to do, exams and that sort of thing" (DR6).

AP1 felt a formal workforce review was required to understand what the operational requirements are for an AP. A shared view from both cohorts is that military APs should receive training specific to their deployed role. Military APs should undergo a blended model of training tailored to their operational requirements. Balancing military needs, clinical placement and targeted academic modules reflected in a job plan.

"I think for the military environment, it does have to be a more blended approach because I think there is the opportunity there is if there is a situation where you end up initially being deployed in a critical care role, but then end up taking on an urgent care or primary care workload. So yeah, I definitely think that there needs to be an element of being upskilled in both areas, which is why I think it naturally fits well with emergency medicine rather than other aspects of it based specialty. Because it's quite a different role to an ACCP, for example" (DR7).

"For those patients who maybe need some kind of blood products from your advanced practice will be right for HERRICK (Op name for Afghanistan), but there is no point for me driving around [my location] with a bag of blood. So yeah, definitely tailor it" (AP5).

"I think that the biggest experiential learning is by doing a hybrid model, I think purely in the UK critical care hems environment, I think you're unlikely to expose to some of the aspects that you do require around primary health care and urgent care. At a more advanced level, I think the difficulty of doing that in the ambulance services, that the urgent care protocols are a little bit limited, compared to the critical care protocols" (DR7).

Both sets of participants believed that, at the end of the training, there should be an overall sign-off to pass and maintain competency in pre-hospital care. Some participants felt a portfolio or annual competency review should be introduced for all military pre-hospital

roles (doctor, nurse, paramedic). This would facilitate a standardised level of competency.

In addition, a competency sign-off would be useful when someone has a break from

clinical practice. The sign-off could aid the return to clinical practice to identify the training

needs required to achieve the set level of competence.

"Yeah, I think hopefully, it doesn't need to be hugely onerous, but I think a portfolio review and a named clinical mentor to say this person is still retaining their skills" (DR3).

"I do believe there should be a 2 yearly any sign off similar to MATTs (mandatory annual training tests) that you are, you know the scope of practice, you are signed off for is your current working practice, or you're going to have to go on a sign off course, but that will also open the door for anybody could achieve these roles whether it comes from a paramedic, nursing or doctor background, and also be caught foul of them if you are from a paramedic, nursing or doctor background. It's really difficult to achieve the competencies if it's not part of your daily job. If your pulled back into a role, like for a doctor doing ICSC (Intermediate Command and Staff Course) for year how an earth do you show you are competent" (DR4).

The absence of a sustainable development pathway and AP strategy has already

impacted APs, resulting in some considering leaving military service. AP9 for example,

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. A posting to a non-clinical position or underutilisation of their

skills was considered likely to result in the individual leaving the Armed Forces.

"I want to remain clinical and progress [as a] practitioner, you know, hopefully that is in the military and we'll see a role for us and we will be utilised. But even if it wasn't I would look at leaving, I'll be honest" (AP9).

Some participants recognised ongoing challenges with retaining nurses within military

service due to the lack of clinical pathways and opportunities. This issue was viewed as

frustrating, as it was felt the military was losing clinical talent.

"The military is missing a trick with the development of nurses because we lose so many fabulous nurses because there is nowhere to send them up to. And you see how they are flourishing back to civilian street and you think of "we missed a trick, oh we've really done ourselves a disservice and I think the other part is actually influencing those nurses below you" (DR4).

For the non-AP participants, AP retention is noted as a "system issue". The absence of a tailored career pathway with opportunities, geographical postings, pay, and employment conditions are highlighted as contributing factors.

"But that's only half the story, you know, then the organisation needs to set conditions. You know, it doesn't have to be about money, it doesn't have to be about rank, sometimes about geographical location, job plans, opportunities, you know, people join the reserves to do different things. And it's about the opportunity of the organisation as far as I'm concerned. It's just whether people in charge have got the insight because it took so long to check this is a system problem" (P2).

"Would I like more rank and more pay, of course! I would always like better rank and pay" (AP7).

"In pay, it does not reflect it. But as a reservist it's difficult, particularly in my squadron as I sit in the medic role as opposed to paramedic" (AP10).

7.4 Theme 2: Trust and Personal Relationships within multi-professional teams

Trust and personal relationships between APs, doctors and other members of medical teams were identified as a key theme throughout the interviews. This theme encapsulated three sub-themes in the analysis: perceptions of trustworthiness, role understanding and professional identity, hierarchy and tribes within professional groups and military rank. Perceptions of trustworthiness encompass the awareness between the AP and other team members in their working relationships. It also describes the APs' need to feel safe to practise at the next level and undertake additional risks associated with advanced practice

in a supported environment. The absence or presence of trust was identified as

problematic partly due to a lack of clear definition and understanding of the AP role. The

need to trust and empower APs to undertake additional skills is also explored.

A second sub-theme related to how roles are understood and defined and how the lack of

understanding of the AP role impacts professional identity, trust and working relationships.

The final sub-theme - hierarchy and tribes - describes the AP role in a medical and military

workforce. APs working within the military hierarchy raised concerns in relation to pay,

rank, postings and recognition. Both clinical and military hierarchies exist leading to

complexity in determining where the AP fits into the medical hierarchy. The demarcation

of doctors, nurses and paramedics is well understood. Their role is defined by terms of

reference, which outlines their scope of practice. These roles are further emphasised with

military rank, setting boundaries regarding seniority and experience. However, the AP role

and its position within the hierarchies, both medical and military, is not defined. As such,

blurs boundaries of these hierarchies resulting in conflicts and challenges.

Perceptions of Trustworthiness

The APs and non-AP participants highlighted the importance of trust in their working

relationships. In particular, APs perceived that empowerment was the result of support

from colleagues, which was considered important both during their training and throughout

their careers. One AP commented on the need to feel "safe" in the support given to them

by others both to enact their role and progress as APs. The importance of this

psychological safety suggests that its absence can cause APs to feel "vulnerable" when

taking on the additional demands of advanced practice. Feelings of safety empowered

them to push the boundaries of their clinical practice, increasing their autonomy and, in turn, having the confidence to take on additional risks in their role as independent practitioners.

The presence of trust between APs and their mentors increased confidence and promoted a safe learning environment for the role to develop. The increased scope of clinical practice associated with APs is inevitably linked to a level of risk; trust within a working relationship helps to balance that risk. In particular, trusting that errors would be met with constructive feedback instead of feeling reprimanded was valued by APs. "On hand" clinical supervision could be offered either directly or indirectly, depending on their experience. APs discussed needing a large degree of mentorship, both peer and consultant-led at the beginning of their training before slowly being "weaned off" as they progressed as an autonomous practitioner.

"I think, as an advanced practitioner, as you will know, a big part, a big part of that pathway is establishing relationships with a (hospital) Trust, once you go through that pathway, in order that you are supported and safe" (AP3).

Trust was considered fundamental when working autonomously as an AP, especially in the pre-hospital environment where there is no access to direct clinical supervision. AP5 discusses interpersonal trust in terms of support from their clinical line managers when having to strike a balance between staying within strict regulations, such as when working with local Standard Operating Procedures (SOP) and being supported in their clinical practice if the patient's condition fell outside of the boundaries of the SOP. Administering medication using a Patient Group Directive (PGD) was another example; if the PGD was considered "tight", it restricted the AP practice. These protocols were thought to become an issue if the patient did not "neatly" fit into them, and APs take additional risks in treating

the patient outside of a SOP or PGD. However, having the support and trust of the clinical lead empowered the AP to practise outside of these protocols if required.

AP2 highlights positive experiences of working with doctors in pre-hospital care where trust was present, such as facilitating flexibility in the protocols and empowering the AP when needing to work at the edge of their clinical boundaries with indirect clinical supervision.

Doctors are considered to hold overall clinical responsibility and leadership for patient care. However, the nature of the AP role has resulted in tasks now being delegated to APs that were previously the doctor's domain, such as patient assessment, clinical decision-making and care planning. This means that the doctor has to trust the AP to undertake the doctor-related tasks for which they hold accountability. The interviews revealed that this trust was based on perceptions of ability and integrity built through open communication and knowledge sharing. For example, it was apparent that doctors felt reassured by the APs seeking feedback about their actions, accurately reporting patient histories and alerting doctors if something was wrong. DR1 suggested that this built positive working relationships with the APs he worked with, who regularly demonstrated the above attributes. DR1 felt he could trust the APs ability and judgement. However, he also knew that if there had been a patient issue, the AP would come back to them for guidance. This demonstrated two-way trust between APs and doctors, each required to make themselves vulnerable to the actions of the other.

"I would always trust our ANPs, when they come to me with a history, it tends to be well delivered. And I trust what they are saying, you know, if they need help, they would be very upfront about it and trust that they're, you know, they will do everything they can" (DR1).

Where trust was apparent between the AP and the doctor, it enabled the APs to practise with little supervision but with the perceived safety blanket that the doctors were aware of their tasks. The two-way trust facilitated the APs to feel as if they were not going "rogue" or "doing crazy stuff", as the clinical lead empowered them to undertake "legitimate" tasks. Furthermore, if the doctors had previous positive experiences working with APs, it enabled doctors to build confidence and trust in the AP's ability to do the job. This example of a positive AP and doctor working relationship with two-way trust empowered the APs to work at their full scope of practice to achieve good patient care outcomes.

"So we *sorted him out, we gave him ketamine and pulled it straight, put it in a bencast™ and dressed it, gave him some longer-term analgesia, gave him his antibiotics pre-hospital, took him into hospital and handed over to the resus team at the hospital. And after the end of the handover, the doc that took the handover said, "basically you've done it all, shall I just book an x-ray and refer to orthopaedics"* (AP5).

APs commented that this empowerment happened more readily when working with military consultants as they understood their military role due to previous deployment experiences. This historical relationship resulted in trust being built. When working with APs, this trusting baseline facilitated military doctors to allow APs to take on additional skills, responsibilities and risks. In addition, one doctor commented that an AP's clinical skill set was a strength in comparison to some of their medical colleagues.

"But I think the difference is that having those advanced practitioners, you've got a lot more assurance to that individual's experience and skills in terms of the in depth patient assessment" (DR7).

Role understanding and professional identity

The lack of definition and identity around advanced practice for both APs and non-APs was noted as an area of concern. This reflects the experiences of civilian APs identified in

the literature review within Chapter 3. Both groups highlighted frustrations relating to a lack of strategy, definition, identity and role understanding. The shared lack of knowledge on the AP role from various members of the multi-disciplinary teams exacerbated concerns related to trust and working relationships. The deficit of knowledge on the AP role from supervisors, line managers and consultants made it challenging to trust their abilities. The lack of clarity also impacted career progression and development in the role.

Some APs felt their career within the military was not defined or fully identified as an AP; therefore, promotion, appraisal reports and postings were negatively affected. For example, the additional skills in terms of clinical leadership, decision-making, and extra responsibility associated with the AP were often not articulated within their appraisals, resulting in their capabilities not being showcased during promotion boards. When presented to promotion boards competing against their military peers, the value of their AP skills was sometimes seen as not comparable or of the same value when measured against other non-AP military ranks.

Several AP participants discussed perceptions that the chain of command did not understand their additional scope of practice. As a result, APs perceived that their responsibilities and overall utility were not recognised or identified by their non-AP colleagues. This lack of definition around the AP role results in ambiguity which in turn increases issues related to trust in their ability.

Some APs felt restricted in their practice as barriers were put in place to ensure their role was bounded. One AP was stopped from practising with their extended skillset and reverted back to being a nurse or paramedic. The managers of the APs who lacked knowledge of the role were reported to have had a sense of distrust in the APs and their skills. The lack of understanding of the AP role in the military has resulted from the limited

experience of working with APs and appears to be further compounded by variations of practice, identity and titles. It became apparent that there was a direct correlation between line managers' experience and knowledge of the AP role and the supervision or trust afforded to the AP and their clinical practice.

"you've got people that may not work with people that work in advanced practice roles who aren't expecting us to have those enhanced skills and then can't see the utility" (AP1).

When questioned about the reason behind this situation, AP1 remarked that the role lacks a clear definition. The participant suggested that the absence of a professional identity is linked to a limited understanding of the role, further exacerbated by a lack of standardisation and ambiguity in the working practices of APs.

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

DR1 commented that during their deployment, they had deployed with a nurse who was not employed directly as an AP; however, they happened to be qualified. During the deployment, the AP was sometimes utilised to their full scope of practice, but this depended on who the deployed clinical director was at the time. At one point during the deployment, one of the clinical directors - who was perceived to have had no prior experience working with APs - stopped the AP from working in that way. This lack of experience of the role resulted in a lack of trust. In contrast, the doctor referred to in the quote below had worked with APs in their civilian role. Their understanding and positive experience of working with APs resulted in the role being used to its full potential during the deployment.

"It was somewhat attenuated by the fact that the clinical director, who I was working under, wasn't particularly keen on the Advanced Practice role in that sense. However, the one before had actively encouraged it and who had been an ED consultant actually actively encouraged it" (DR1).

APs were concerned that there was a lack of recognition of their AP role and achievements. It was felt that their enhanced skill set and additional clinical responsibilities were not understood by their line managers.

Interviewer:
"In terms of your senior leadership team, your chain of command, do they understand what you do in your role?"
"Not entirely I think, I think that's getting better. And, you know, there's now more senior senior level input, certainly doing this sort of doctrine work as I think there is a greater understanding of the role because it is sort of in its infancy" (AP3).

This was noted in their work not being fully appraised in their annual Officers Joint Appraisal Report (OJAR) or Service Persons Appraisal Report (SJAR).

"I think even whilst my 1RO or 2RO (1ˢᵗ and 2ⁿᵈ OJAR/SJAR reporting officers) are trying to understand what I do, it's very difficult for them to understand what we do" (AP1).

Furthermore, APs perceived that there was a disconnect between what the APs felt their career progression and assignments should be. The APs wanted to remain in clinical-facing posts for longer periods of time. On average postings can be 2-5 years. There was a strong correlation between positive working relationships that were built on trust if the military APs were posted to a JHG for an extended post. This enabled the AP to become established and build working relationships.

Aside from the length of time in a post, both the Officer and non-Officer APs reported being offered posts that were non-clinical such as staff roles, command, and instructional duties. This was often the case to ensure their military role was broad and allow them to

showcase their leadership skills in different roles. However, the APs felt that they should

remain in a clinical role throughout their career in the Armed Forces.

"Yeah. I think they still don't necessarily understand the role or understand what benefit is or where we could be used because obviously there's not that many pids (jobs) and or there's the pid (jobs) in the HSU now but they (senior leadership team) don't really see where else it will fit in" (AP4).

In the below quote, AP1 commented that the additional non-clinical roles were not required

as they are fulfilling what is being asked of them as a military nurse in an AP role. It was

felt that the AP role delivers the capability that the senior commanders expected at the

level of a military nurse. However, there seemed to be a disconnection of expectations

from the senior leadership team on what a military nurse could deliver versus what they

actually do. This disconnection resulted from what the commanders wanted from military

nurses and paramedics, often having higher expectations in terms of clinical outputs and

level of autonomy without the additional clinical exposure and pathways to support it. For

example, the expectation in terms of the autonomy of what is required from a level 5

MERT nurse is not mirrored in their clinical role at a JHG. Very few military nurses have

the opportunity to obtain civilian pre-hospital care placements for experience before

deploying however are expected to deliver in a pre-hospital role on operations.

"And we need recognition from commanders that this is what we're doing and we might not be writing a staff paper or sitting in an office at a desk but actually, from an operational perspective absolutely what we're doing is providing the capability that they've (commanders) have been banging on about in their press releases to the four star (senior leadership team)" (AP1).

For military paramedics who are employed as medics, the role is often not in a full-time

clinical post. Military paramedics are recognised as having an additional qualification

added to their role as a medic therefore are not professionally identified as paramedics.

Therefore, a paramedic is not recognised as a paramedic; they are a medic. A medic is

considered junior to a paramedic in the medical hierarchy, and this often results in their

misemployment.

As mentioned previously, they are required to work in a variety of non-clinical postings

undertaking clinical hours at the same time. This results in a paucity of clinical exposure

and skill fade in preparation for their deployed role. Compared to nurses, paramedics

cannot be commissioned as Officers, which impacts their position in the military hierarchy

and ability to influence development. The paramedic role was introduced in the Army and

RAF 20 years ago. The Navy does not employ paramedics.

AP2 felt that role understanding was more of a deeper issue with the current established

roles for paramedics. Due to the historical lack of clarity on the paramedic's role in the

military, this was an ongoing issue. It seemed from AP2 that the military needed to be

further informed on what a paramedic's role was and their additional scope of practice

compared to a medic. This was a fundamental issue before addressing AP roles from the

paramedic cadre.

*"I think we need to, especially from the paramedic side, we need to be professionalised a
little bit more. I think people need to understand what a paramedic is and I think,
potentially, we don't necessarily educate people about what a paramedic can do. And,
and therefore, you know, an advanced nurse can do"* (AP2).

As mentioned previously, there is no current strategy and or role identified for APs. AP3

felt that it was now up to the APs themselves to identify a role within the military and

contribute towards future doctrine. Some APs felt they needed to fight for their existence

and to justify their purpose to secure future employment as an AP. This created feelings

of pressure or concern about their career as a military AP post-training.

"I think this is a sort of retrospective sweep up to define that, define the capability or be at some of them (APs) have been spat out the other end already qualified erm so that's that's quite, that's quite political, but it is really sort of how it is now, there are a few of us that have gone through this. It's, it's our job to, you know, show the sort of operational requirements and what they can add value operationally" (AP3).

The participant below highlighted challenges in regard to the lack of standardisation from a

non-AP point of view. Varying training pathways and titles were identified. This caused

uncertainty about the AP role and their scope of practice. For example, the ACP role is

now defined with set competencies; however, the ANP role has been used

interchangeably without standardisation. Military nurses have referred to themselves as

ANPs whilst working in a non-clinical role for a number of years. Therefore, they will have

likely be deskilled in clinical practice. Variability and lack of familiarity with the role affects

trust and acceptance of risk with patients by the DMS.

"It's always a bit tricky, obviously, with the lack of standardisation about who calls themselves what and the degree of credentialing" (DR1).

From a military stance, views were raised in reference to legacy ANPs and their

requirements in other specialities, such as primary care. It was noted that their role, titles,

and training had not been fully defined in either of the three services (Army, Navy and

RAF). At the time of these interviews, several titles were being used interchangeably:

ANP, MNP, GP Nursing Officer, APhecP and ACP. The perception of competing agendas

from each of the services, the lack of clarity of what is required for APs and the

standardisation of the role continues to be problematic for professional identity, working

relationships and trust. For civilian APs, HEE has published various AP strategy

documents that define the role and standardises by outlining the scope of practice.

*"That's a completely separate issue to defining a role for the advanced nurse practitioners
in the military setting. I don't think anything is really decided, aside from the RAF where
there is a definite role for it in the HSU. The army hasn't really nailed down where an
advanced nurse practitioner should be working. Should it be instead of a GDMO (general
duties medical officer) backing up a GP and role 1? They just haven't really decided"*
(DR2).

From the non-AP group, it was considered that APs moving into clinical leadership and

research would help to further identify and professionalise in the military amongst medical

colleagues.

*"One area that I can see it happening, as well as sort of the high-end clinical stuff, you
know, pre-hospital, where we could clearly use people with that skill set is that at some
point, you know, a lot of the research, clinical guidance, you know, clinical leadership still
comes from doctors within defence. And that needs to be spread out"* (DR1).

Hierarchies and tribes within professional groups and military rank

A theme throughout each of the interviews was the complexity noted within different

hierarchies. Concerning military hierarchy, rank was identified as an area of concern since

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 personnel was

highlighted as an issue regarding the availability of clinical postings at that level. 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. There seemed to be a

divide between progressing through the rank structure and clinical advancement.

Tribes in this theme refer to different professional groups, doctors, nurses and paramedics.

Participants highlighted further issues in relation to interprofessional politics related to

identity and roles when these tribes clash. Opinions concerning professional identity

related to a perceived tribal mentality in relation to individual roles, nurse, paramedic and doctor. It was apparent that the AP role overlaps with each of the tribes' causing conflicts in terms of role boundaries. Inter-professional dominance was noted amongst the APs and their position in the medical hierarchy. More specifically were concerns related to where APs fitted into the military PHEC levels. Some of the APs felt restricted or boxed into certain levels of PHEC practice due to their clinical level not being recognised. Rank and prescribed roles seemed to tighten and restrict clinical development within the DMS workforce.

From the below quote, AP2 uses the term "antiquated", suggesting the military had not caught up with the NHS and had a culture of outdated professional boundary restrictions. The AP participants felt the NHS had modernised their workforce by delivering AP roles supported with policy and role definition.

"I think. The military is. And the (single service) in particular are still very antiquated in a lot of their roles and a regimented system, and regimented to roles, it's a very regimented system and a pathway of what you should be at what rank" (AP2).

The notion of military nurses' or paramedics' core role not being recognised or the perception of the military still holding stereotypical views was raised as a concern for AP practice. The extended skills a nurse or paramedic has in the role of an AP were recognised by the NHS. APs perceived that they were better understood by their civilian colleagues than their "outdated" military colleagues. There seemed to be a clash between civilian and military medical cultures. The DMS is an organisation that is consultant-led, resulting in the majority of the high-ranking senior leadership team consisting of medical Officers. It was felt that the doctors within the DMS were professionally dominant due to the "regimented" culture in the military and medical hierarchies. Some of the APs felt

restricted in their development due to this tight organisational structure. However, the use

of first names was perceived to promote an informal culture and "flattened" hierarchy.

"I think some of the older ones are just a little bit more into that dare I say it. Oh, paramedics just are ambulance drivers and nurses are just do what I say in ED, I think there's still quite a lot of culture that we need to break down. I think it's better in the medical services, I think that we use first names a lot more than maybe you would do, when I worked in a regimental system. But I think there's definitely a command gradient that needs to be sorted out. Alongside the technical gradient" (AP2).

Despite the promotion of a "flat hierarchy" and use of "first name terms", it was perceived

that communication still revolved around rank and status. Non-Officer APs commented

that on occasions when conversations around advanced practice pushed the boundaries

of the discussion, the social interaction was swayed by the status and power held by those

with the highest rank.

"And they (senior Officer/non-Officer ranks) haven't met you before very early in the conversation. The eyes will flick down to look at your rank slide. And then the conversation will continue. That's a very military thing" (AP5).

Participants discussed if APs should be Officers only. Within the RAF, the AP role is open

to both Officers and non-Officers; however, within the other two services (Navy and Army),

the role is only available to Officers. Prior to this direction, there were a few legacy non-

Officer trained APs who remained in service and were included in the interview

recruitment.

"in the (single service) when I went to the deep dive meeting erm when they were having a discussion. The senior Officer basically stated that she didn't believe other ranks should be practitioners" (AP4).

Interviewer *"And how did you feel about that?"*

"erm I thought it was short sighted in the sense, not being funny, a lot of the time Officers are pushed into eventually doing staff jobs, if they want to be promoted, they've got to do staff jobs. So your continuity lies with your other ranks?" (AP4).

Further concerns related to promotion to senior ranks and not having a clinical career to support their AP practice if they advanced to the next rank were raised. This was an issue because the roles aligned with higher ranks are non-clinical. If promoted following the board, the individual has to accept a post that is aligned to the next rank that is offered, and this is invariably non-clinical. AP4 seemed to feel torn between remaining clinical and not achieving the next rank through promotion.

"I don't want to be promoted to warrant (Warrant Officer the most senior non-commissioned rank) because if I got recommended or got picked up, and I got given it, I would automatically [be] assigned to do a welfare post or whatever else post. I want to stay clinical and do my practice in pre-hospital" (AP4).

Asides from the military hierarchy, a few of the AP interviewees highlighted issues associated with the medical hierarchy. The following statement outlines perceived stereotypical views on how the different medical roles are viewed in the Army.

"You ask 100 people in the general population in the army of doctors, nurses and paramedics do? I bet you'll get paramedics drive an ambulance, nurses help doctors and doctors are amazing. But that's not true. We know that's not true, but it's, it's getting that through to the hierarchy" (AP2).

"I think we just need to. Yeah, work with it, work through it and education is a key piece, especially, honestly to our doctor colleagues and like the older doctor colleagues, you might not quite get it, we're not trying to take people's jobs, we're not trying to do what we're not supposed to do, but we have got, we have got a lot of bright motivated, clinicians who want to progress, and we need to embrace that as opposed to just saying oh no that's, you can't do that you're, you're just paramedic or your just a nurse, it's not indicative of how the NHS is moving forward and we need to keep our bright people" (AP2).

From the non-AP group, there seemed to be a mismatch between where APs fit into the medical hierarchy. Some AP participants were allocated to a doctor's rota in place of a registrar and felt that after they had completed the AP training, they were working at the

same level as a registrar. However, their role as APs was not always as well-received by other professionals or indeed recognised as holding the same amount of status as a registrar. This manifested itself with different professional groups not listening to APs during requests, referrals or delegation of tasks. APs felt they were more likely to be challenged during referrals to other teams and with the delegation of tasks compared to a doctor. This affected autonomy as APs may have to go back to the consultant to ask for further support, for example, a signature on referrals.

The notion of APs replacing or being labelled "mini doctors" seemed to negatively impact the advancement of the role from both AP and non-AP participants. From DR1, the AP and registrar roles were not comparable in terms of outputs and training.

"Yeah, ANPs who come to me and say, 'Well, you know, not based on my (hospital) Trust. But, you know, I work at a registrar level that misses the point that registrar's have a clinical skill set, but are usually involved with doing a lot more on that shift. So, yeah, if you have an ANP who is trying to be nurse in charge, and do their clinical stuff, fair enough, that's what we ask our registrar's to do overnight is to be the senior clinical decision makers, and supervise ANPs" (DR1).

"And I don't see them as mini doctors, I see the role as being different. I would also refute any suggestion, I mean, we have to sort of place them I guess, in a particular level in our thoughts when we're moving around the department" (DR1).

In addition, depending on the seniority of the doctor, also played a part in their perception of the AP role.

The majority of the participants felt that the AP role has its own identity, and it didn't matter what background the individual had come from (paramedic or nurse). AP2 and DR1 suggest that APs are their own role and should be recognised for their skillset, not their previous background. For example, an AP working as an ACP in ED could be a

paramedic or nurse; however, it was considered irrelevant as they have now transitioned

to an ACP, not a paramedic or nurse any longer.

"one could argue you shouldn't even have to say whether you're a nurse or paramedic because that shouldn't really matter" (AP2).

"When it comes to level six, I just trawl for level six. Yeah, I wouldn't expect to be going like, you know, we need three level six on this, shall we have 2 paramedic level six, shouldn't matter it's like having an ACP you know, if your ACP I don't care whether you've been a paramedic or nurse, you're an ACP" (DR1).

From the AP group, there were further concerns around medical dominance, particularly in

pre-hospital care. Where it was perceived that doctors in pre-hospital care hold onto

certain critical care skills to justify their existence in that speciality and increase their

status.

"There's a cadre of physicians in the UK, both military and non-military, who are very, very fixated on increasing the number of physicians in pre-hospital care. And people who will drive forward physician pre-hospital, they write the sort of papers that you and I have read, you just think my god you know, what is this nonsense, and they are very, very controlling of the interventions that they could deliver to sort of justify them being out there" (AP5).

"I think there is a strong, very senior level of doctors with a strong desire to stay involved in pre-hospital care. I think they enjoy it, and find it stimulating. And I think they want to keep hold of it and part of keeping hold of the critical care elements of pre-hospital care is avoiding young upstart paramedics stealing their chips. I think that is definitely true in non-military pre-hospital care when you meet some of the doctors that fly with air ambulances. You know, a lot of it is around the work and providing the evidence to prove they were needed" (AP5).

However, from the non-AP group, one doctor felt that APs working alongside a doctor

gave them more freedom and flexibility. As it was perceived, they were restricted by

policy, especially during medication administration.

"my personal feeling to get the best out of them [is that] they need to be working with a doctor. But the only thing that I justify that with is they don't have a huge ability to use lots of medications. So they're still working from PGDs and PGDs are quite limited. And doctors just, just give them that freedom to to utilise their skills because the doctor can worry about the medicines, medicines management, and the critical care paramedic can get on with all of the other skills they got, I think with their skill set and you don't have the ability to use lots of medications, sort of it limits them a little bit. And I think that sometimes they feel uncomfortable in situations they're in because they know what they need to do, they just aren't allowed to do it because they can't use the medications that they need to use. And so I think they prefer, at the moment, to be working with a doctor that just gives them a little bit more licence to practise" (DR2).

From AP2, a flat hierarchy was actively promoted in their area of work; however, the use of a separate drugs bag exclusively for use by doctors still raised the issue around medical hierarchy.

"We've got a doctor's drugs bag which everyone fundamentally disagrees with because we are such a flat hierarchy yet we separate our drugs between what paramedics can use and doctors can use" (AP2).

In terms of military pre-hospital care, the AP group raised concerns about the military PHEC levels. The military PHEC levels are classified by roles, level 5 nurses or paramedic or GP and level 7-8 is for PHEM speciality doctors only. It was perceived during the interview that they did not fit into the levels, further promoting a regimental culture. Furthermore, AP5 struggled to see the purpose of the levels. AP2 felt that the levels restricted practice as skills were labelled into levels by their role and not skills.

"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. And it's about defining the levels to be able to say to your mates "I am a level 8 practitioner, and that seems to be" (AP5).

7.5 Theme 3: Future role of military APs

This theme focuses on the future of military APs. The sub-themes included; The value of the AP role in deployment and challenges for operational APs. During the interviews, 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 be employed within to meet future operational challenges. However, despite their proposed conceptual utility, concerns were raised about how the DMS could put these concepts to fruition.

The value of the AP role in deployments

Participants were asked if they could see a role for APs in future deployments. Both APs and non-APs suggested a range of different capabilities an AP could be employed in where they could see advantages and value being added in terms of delivery of patient care. Recommendations for deployed roles were suggested for each capability featured along the operational patient care pathway.

"I think as part of a useful multidisciplinary team, as consultants can't be everywhere, there is just not enough of us. So I think there's probably a role in relatively mature, relatively stable Ops, having pre-hospital specialists, advanced practitioners, supporting either gdmo or GP. Now, whether that person comes from a paramedic or a nursing background, I think is less important then the fact you are a pre-hospital specialist" (DR3).

"we're at the beginning of a process that I think has a lot of potential to move forward. I think it's a potentially quite an exciting time to be hopefully moving forward with that and figuring out what we've got. And what we can do. Because I do think we have massive utility for the main RAF, I think all ACPs massive utility for the military" (AP7).

"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 utilised" (P1).

More specifically, participants could see a role for an AP working in remote treatment units such as Role 1, Role 2 and pre-hospital treatment teams 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 facilities. 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 length of 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 whilst awaiting retrieval back to a Role 3 facility.

"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, that's more on the doctor, paramedic nurse model. But working autonomously, they definitely have a role in role 1, pre-hospital treatment teams, definitely" (DR2).

Some of the AP participants have reported having previously "exercised" the AP role in a Role 1 and 2 capability, seeing positive benefits for patient care. Indeed the RAF Hospital Staging Unit, a Role 2 facility, employs an AP within the Emergency Department. A participant recalled adding value as an AP working in the HSU. They described how the medical workforce within the HSU would be reduced and that an AP is able to support the team by providing resilience to the doctor in ED. The HSU ED is currently scaled for one consultant. The AP provides cover for the consultant to get in-between rest and shifts by providing an autonomous clinician.

One participant could see a role for an AP within critical care repatriation. Drawing on their experience of transferring critically unwell patients within the NHS during the COVID-19 pandemic. It was felt that the majority of these patients are often stable however, due to the complexity of the transfer would require an AP specifically trained to do this role.

"I feel that there is a role for advanced practice, whether that's paramedics, nurses in critical care transfer" (DR2).

From a military PHEC perspective utilising an AP at level 6 was viewed as providing an increase in skill level in terms of 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).

"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" (AP1).

An AP working in PHEC at level 6 could offer flexibility in terms of 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 assure the process of moving multiple ventilated patients without a team specifically trained in this role.

"I'm very keen to make sure that you know, we 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've would like to do will probably have done in the past without that solid governance foundation like looking after multiple intubated patients" (DR1).

Having an AP within a 4-person team could enable the team to be split down 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.

"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" (DR4).

Collectively participants identified various benefits for AP in deployed healthcare within the Operational Patient Care Pathway, whether working in remote treatment centres to support individual consultants or enhancing a MERT level 8 team for a split team configuration. These advantages an AP could provide were perceived to include autonomy, advanced clinical decision-making, resilience, and flexibility for operations.

A shared view amongst participants considers that future operations will result in personnel spread more disparately over larger operational areas resulting in an increase in patient timelines and prolonged field care. This would be supported by technological advances such as telemedicine to improve communications and support. Developments in this area will offer the ability to communicate in a medical in confidence way via voice, data or imagery. Participants felt that this would provide support and assurance to an AP deployed remotely to reach back and support in clinical decision-making from a senior clinician.

"Yeah, definitely. You know, utilising remote supervision, real time feedback, video. Methods to be able to deliver feedback or advice remotely, I think is definite is a definite area, that we could assure the system slightly better" (DR7).

"As part of a system, you know, you've got telemedicine coming on board, we've got Pando (mobile medical encrypted app for telemedicine). If we're looking at different contested airspace and stuff, moving forward, you know, next five to 10 years, then I think advanced practitioners would add value" (P2).

Challenges for operational APs

Despite the participants aspiring to where an AP could be deployed for future operations, there was a clear divide in how they could practically be generated and developed for the military. This was due to its perceived associated challenges with integrating into the DMS. It was apparent that APs were viewed positively, with a range of opportunities for both personal development and benefits for operational working. However, the justification of their use on deployed missions remained unclear.

"We have not so far encouraged advanced practice, because I think it was difficult to see where it would fit in" (DR1).

Some of the participants felt there was confusion about what each of the services wanted from an AP. Different titles, scopes of practices or roles result in conflicts between each of the services.

"And it's such a small number of people in each job, that the ability to communicate and develop that program to benefit defence and the patients and the individuals who are going through it and develop those roles just becomes really complicated. At some point gets pushed into the all too difficult path. You work on yours, we'll work on ours. And at some point they'll clash because they'll have totally different outcomes" (N2).

However, a shared view amongst participants was that operations could rapidly drive through innovation within defence. Examples were given from Op HERRICK and COVID 19 pandemic. It was felt that a future operation would likely focus on and speed up AP development within the military, if the need was identified.

"It's a slow machine because there's so many different people involved in so much politics around. But when we are forced to change we will change very very quickly" (P1).

"I mean you just need to look at COVID and that the medical need is clear, clearly defined, forward, following out, everything's unlocked, cash is unlocked, training is unlocked, etc, etc. So if there was a demonstrable, urgent operational requirement for it, it would be

easy. But it isn't easy to show. We don't know what is going to be required in the next operation" (DR5).

Some participants could not see a role for an AP as the military delivers consultant-led care. However, one view was that if a deployment did not need consultant-level care, then it would be pointless sending that level of expertise when an AP could be deployed. It was considered that an AP could "plug gaps" on deployments either when the operation was "consultant light" to provide resilience or in place of a doctor. One participant shared the view of a tailored workforce to meet the needs of future operations, matching PHEC-level qualified clinicians for patient demand rather than defaulting to consultant-delivered care for every deployment.

"So I think there's probably a role in relatively mature, relatively stable Ops, having pre-hospital specialists, advanced practitioners, supporting either gdmo or GP. Now, whether that person comes from a paramedic or a nursing background, I think is less important and then the fact you have a pre hospital specialist with the ability to deliver advanced care without necessarily having, you know is less relevant having a consultant level service, because you haven't got all the infrastructure that is required that is needed for the delivery of pre hospital critical care, you can send me with as much kit as you want, unless there is a proper structure for me to hand critical care patients onto there is no point me being there, advanced practitioner could fill that intermediate role" (DR3).

7.6 Conclusion

This qualitative phase of this study reports three primary themes. Theme 1 explores the current work and career management of military AP. The non-AP participants demonstrated a solid understanding of APs, drawn from experiences of working with civilian APs in the NHS. The combination of this experience resulted in participants seeing a role for military APs who could deploy operationally and be autonomous in remote locations.

A second theme relating to RQ 2 and 3 related to trust. Drawing on the rapport between APs and consultant mentors, trust was understood by the participants to promote autonomy by instilling confidence while delegating tasks to APs. Building on trust, sub-themes illustrated the complexity of interpersonal relationships within multi-professional teams. The presence of trust and collaboration within these teams was identified as a critical factor shaping the opportunity for development of APs. Conversely, the impact of medical and military hierarchies was evident, with identified restrictions imposing professional dominance over APs. This understanding of role dynamics directly influenced the career management of APs, highlighting the need for role identification to support AP career management.

A third theme from the interviews was the necessity for standardisation, where participants advocated for credentialing, which aligns with civilian AP practice. This standardisation was perceived as vital to ensuring consistency and contributing to a clearer definition of responsibilities within the military healthcare workforce. Shared views throughout the themes demonstrated the absence of doctrine relating to AP strategy and has led to the misemployment of APs. The variability in job plans and clinical placement time for paramedics, nurses, and APs needs to be clarified regarding the expectations for APs to meet the operational needs of the UK Armed Forces.

Concerning the future deployment of APs for operations, participants suggested that APs have a wealth of clinical and military experience that could be translated to PHEC providers in a Level 6 capacity. This could firstly augment a Level 8 team, and second, in critical care retrieval, particularly within Role 2 military treatment facilities for prolonged field care. This expanded role has potential to mitigate risks by ensuring timely access to care and provides resistance to the DMS workforce on deployments, especially for

singleton on-call consultants. The integration of telemedicine was identified as a potential

enhancer of performance, especially in supporting APs during remote operations.

Given the differences in the demands for military healthcare, the interviews found there are

differential drivers compared to civilian contexts. Flexibility and resilience for operations

emerged as key requirements. The next chapter will draw together and discuss the

empirical data from interviews and the Delphi study to triangulate, discuss, and interpret

the findings in a mixed-methods analysis, offering a holistic understanding to answer the

research questions.

Chapter 8: Discussion of findings

8.1 Introduction and summary of findings

This chapter integrates the findings from the two phases of the empirical work and reviews

the main integrated findings of the study in the context of other research, particularly

drawing on the literature identified in the literature review. The integration of the Phase 1

and 2 results aim to present a comprehensive view of the complexities and challenges

associated with military PHEC AP practice and to address the research questions of the

study. As such, the research questions were used as a framework to guide and shape the

mixed-methods triangulation phase of the study. These provided a structure for the

analysis to ensure that all relevant aspects were addressed and explored systematically.

See below figure 8.1, a diagram of the sequential order of the study.

Figure 8.1 Sequential order of the Phases of the Study
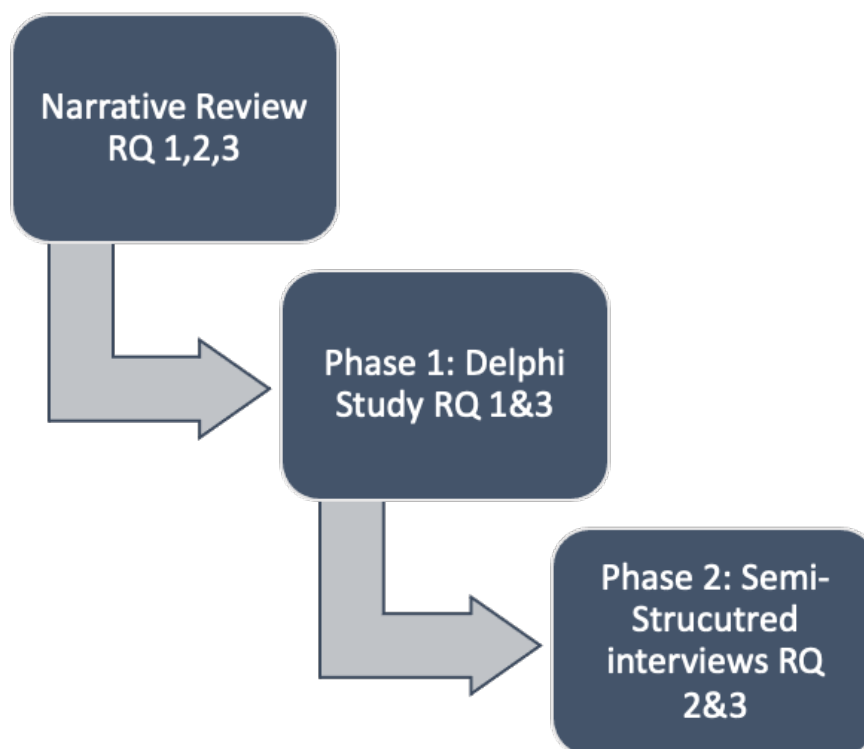
The research questions that this research has attempted to answer are:

RQ 1. What clinical and non-clinical skills are required for the performance of L6 pre-hospital emergency care in military settings?

RQ 2. What work activities do military APs currently perform in practice?

RQ 3. What are military pre-hospital personnels' perceptions and experiences of the AP role as it currently operates, and what are their views on its future value in military settings?

A summary of the main findings of the literature review, the Delphi study and the qualitative study is presented in table 8.1. These are discussed further in the following sections.

Table 8.1 Summary of main findings from the literature review and each phase of the study

Research Questions	Literature Review Themes	Phase 1: Delphi Study	Phase 2: Qualitative Phase
RQ 1. What clinical and non-clinical skills are required for the performance of L6 pre-hospital emergency care in military settings?	*Theme: Advanced Pre-Hospital Roles: scope of practice and impact on patient care.* Advanced Skills associated with PHEC L6 practice included: ALS, Sedation, supraglottic airways. Additional skills needed for military PHEC level 6 require a combination of advanced training consolidated in relevant clinical practice.	45/205 skills found to be PHEC Level 6 scope of practice inclusive sedation, ALS, inotropes (full breakdown in figure 6.2). Conflicting competencies that did not reach consensus included; chest drain insertion, endotracheal intubation, escharotomies & POCUS. Concerns raised regarding advanced skill maintenance for PHEC L6, training, risk versus benefit for patients, and the operational requirement.	Interviews indicated that APs in PHEC should possess skills such as sedation, independent blood administration, ultrasound, and advanced airway management. In addition, critical care retrieval and management of musculoskeletal injury. Concerns regarding maintenance of skills once APs are trained to perform PHEC level 6 competencies and how to reduce skill fade.
RQ 2. What work activities do military APs currently perform in practice?	*Theme:* Advanced Clinical and Non-Technical Skills above PHEC level 5 pre-hospital providers. Studies indicated that enhancing the workforce's skills through advanced training had a positive influence on reducing patient mortality.	Issues regarding current clinical placements, insufficient training programs and the level of support for APs to deliver PHEC level 6 skills were raised.	The presence of trust between APs and their consultant mentors played a pivotal role in granting autonomy and the confidence to trust APs with the delivery of competent care. Personal relationships within multi-professional teams emerged as a crucial factor

			influencing the development of APs.
			Influence of medical and military hierarchies had restrictions in place that exerted a degree of professional dominance over APs.
			Role understanding which had a direct impact on career management.
			Requirement for AP role standardisation and credentialing to align with civilian practice.
RQ 3. What are military pre-hospital personnel's' perceptions and experiences of the AP role as it currently operates, and what are their views on its future value in military settings?	*Theme: Performance of pre-hospital teams and impact on patient care* A subset of trauma patients ISS 16-50 benefit from additional skills. Continuous CPD and CCE were required to deliver in the role of AP for positive patient outcomes. Literature cites the drivers for APs were to primarily fill medical workforce gaps.	Role conflict and dominance emerged as findings from the short answer responses, with tensions evident between nurses and paramedics, as well as between GPs and nurses/paramedics. These tensions centred around the question of which role should be primarily responsible for performing PHEC Level 6.	The future role of military APs could be utilised in two aspects: first, the provision of PHEC level 6 care and the augmentation of Level 8 teams. Secondly, for critical care retrieval, Role 2 military treatment facilities, specifically in delivering prolonged field care. This expanded role could mitigate risks by ensuring patients have timely access to care. Furthermore, it offers a layer of resilience to the workforce on deployments, especially for singleton on call consultants.

			Role of telemedicine may enhance performance and support APs on remote operations. For the military the drivers are different to civilian settings. These include flexibility and resilience for operations. Plus the role offers nurses/AHPs with a clinical facing career which was seen as a retention positive incentive.

8.2 What clinical and non-clinical skills are required for the performance of L6 pre-hospital emergency care in military settings?

The Delphi study aimed to identify an agreed list of requirements for PHEC level 6 care to address RQ1. This is the first study using a Delphi method to review competencies for military pre-hospital practice. Within table 8.1, the Delphi study found that 45 FPHC (added to all levels total 200 competencies) items reached a consensus of agreement for PHEC level 6 care by 69%, just failing to reach the 70% (the level of consensus regarded as desirable for Delphi studies). Powell (2003) suggests that presenting the findings is important, enabling readers to draw conclusions about their findings. If consensus is not reached, further research can be undertaken to support the Delphi findings. Nonetheless, procedural sedation, administration of blood, inotropes, and paralysis for post-cardiac

arrest care were inclusive of skills that reached a consensus. The above-agreed level 6 competencies reflected the findings from the literature review conducted prior to the Delphi study (Sharpe et al., 2018, Maddry et al., 2016, von Vopelius-Feldt and Benger, 2013, Calderbank et al., 2011), presented in table 8.1. Although full consensus has not been concluded, these additional items have broadened and opened the narrative toward the current requirements of PHEC level 6 practice which includes safe sedation, blood transfusion and rescue airway devices.

Theme 4 from the semi-structured interviews further explored specific AP PHEC skills for level 6 practice and built on the findings from the Delphi study. There was a clear agreement amongst interview participants that military APs should be able to prescribe, perform sedation using ketamine and undertake POCUS. There remained a debate on endotracheal intubation and chest drain insertion. In regards chest drain insertion, most views focused on the requirement for a chest drain in the pre-hospital setting as a replacement device for the management of pneumothorax was being brought into service. From the Delphi responses, participants felt that chest drains did not have a place in military pre-hospital care or were rarely required. The FPHC consensus statement does not routinely advocate the use of chest drains for chest injuries in the pre-hospital setting with regards to life-threatening chest injuries. For tension pneumothorax, needle decompression should be the first-line treatment; if this fails, an open thoracostomy for positive-pressure ventilated patients should be considered. The statement suggests chest drain insertion should be avoided due to the risk of infection, prolonged on-scene time, and technical failure (twisting or blocking).

Chest drain achieved 36% consensus for PHEC level 6 practice in both rounds 2 & 3 and

remained conflicted in round 4. Some participants commented on the need to retain the

skill for altitude rescues or prolonged field care. FPHC comments that for 'high-altitude

aeromedical' retrieval, a chest drain may be required (Leech et al., 2017). In addition, the

FPHC supports chest drain insertion as a competency for PHEC level 6 and above (Leech

et al., 2017).

Other participants expressed the view of undertaking a thoracostomy and covering it with a

chest seal. The consensus statement advocates against this procedure, stating 'covering

an open thoracostomy with a chest seal is considered unsafe due to the risk of the seal

blocking resulting in a tension' (Leech et al., 2017). A South African Delphi study

conducted in 2019 reviewed expert opinions on the requirement for pre-hospital chest

drains. The panel agreed that the need to insert a chest drain depended on the pre-

hospital timings and the likelihood of the transport being prolonged over 60 minutes. In

addition, aviation requirements such as altitude, pressure and needle decompression

failure were also possible indications. However, the procedure must be weighed up

against the above risks highlighted in the FPHC consensus statement (Dippenaar and

Wallis, 2019). Arguably as the military moves towards prolonged field care operations

extending the pre-hospital timeline, it may present the need for chest drain insertion.

Concerning endotracheal intubation, conflicting views remained in both phases of the

study. This was due to several issues, firstly the need to perform intubation as other

airway devices have been proven to be effective when compared to intubation (Benger et

al., 2018, Wang et al., 2018). Secondly, the "maintenance" of the skill in the civilian

setting. For most non-physicians working in pre-hospital care, intubation has been removed. Some participants expressed the view that endotracheal intubation should remain a skill for APs, as this advanced airway skill provides additional support to a level 5 team in the absence of a level 7/8. Some APs expressed an opinion that endotracheal intubation was now a "doctor-only" skill.

A meta-analysis by Lossius et al., (2012) of 1070 studies involving 15,398 patients reviewed intubation success carried out by physicians (2536) with non-physicians (12,862) (Lossius et al., 2012). This research found there was generally a high success rate at 0.927 (95% CI 0.882–0.961) in both groups. In a subset analysis of the non-physician intubation attempts, the median rates of success were 67.5%, 81% and 96.7%. Despite the physician group having a higher success rate over the non-physician group, the research concluded that additional training and clinical practice were understood to impact success (Lossius et al., 2012, Lockey et al., 2014, Birks, 2016). This research suggests that intubation outcomes are variable and directly attributed to the level of training and governance (Lockey et al., 2014, Birks, 2016).

From the narrative analysis of the Delphi open questions and written responses, some participants commented on replacing endotracheal intubation with supraglottic airways. This lack of consensus on intubation may partly be a result of two large multi-centred random controlled studies conducted in 2018 that compared a supraglottic airway with intubation during adult cardiac arrest.

The first, a UK-based study known as the 'Airways 2 trial' conducted by Benger et al. (2018), found there was no difference seen in either the SGA versus intubation. Measured

from both discharge to functional outcome and 30 days after the pre-hospital cardiac

arrest. Both arms of the trial remained undifferentiated. In addition, secondary outcomes

demonstrated no other differences in aspiration, the return of spontaneous circulation or

regurgitation in either of the devices. However, ventilation success was quicker in the

SGA group due to the intubation procedure taking, on average, 2 attempts to secure the

airway. SGA, in comparison, was 2.7 minutes quicker to perform when compared to

endotracheal intubation (Benger et al., 2018). In a subsequent US multi-centred cluster

crossover study of 3004 patients, Wang et al., (2018) compared laryngeal tube devices

with intubation again in pre-hospital cardiac arrest. The paper found that from the

laryngeal cohort, these patients had a significantly higher 72-hour initial survival, discharge

and favourable neurological outcome (Wang et al., 2018). Both studies demonstrate that

an SGA, which includes a laryngeal mask device, compares well to endotracheal

intubation. These studies are likely to have fuelled the debates seen in the statements

from the short answer boxes. Despite the evidence from the above studies, there may be

a requirement for endotracheal intubation. SGA-only insertion is not always the right

choice for every patient. One participant commented that intubation should be desirable

rather than an essential skill for level 6 practice. From round 2, 72% of participants voted

this as a requirement for PHEC level 6 care. Jannu et al., (2017) outline patients that are

at risk of gastric regurgitation as one of the main contraindications for SGA use. These

patients include those that are obese, have a hiatus hernia or are pregnant (Jannu et al.,

2017). This may question the need to retain intubation as part of skill for advanced airway

management. In addition, both of the above studies reviewed adult cardiac arrest and no

other presentations, such as trauma or paediatrics, where other airway strategies should be considered. Despite this ongoing international and Delphi debate around SGA versus intubation, it is crucial to note that familiarity, training and competence in any airway intervention is considered vital.

In terms of PHEA, the Delphi study and interviews recommended that PHEA for UK PHEC is considered a physician-only intervention (Davis et al., 2007, Calderbank et al., 2011). Since the above review was published, further research has been conducted that questions some of the indications for PHEA. A retrospective study found that pre-hospital anaesthesia may be considered harmful in awake patients with hypovolemia (Crewdson et al. 2018). The authors concluded that there was an association with in-hospital mortality following awake hypotensive patients who had received PHEA. This was exacerbated if the patient was traumatically hypovolemic (Crewdson et al., 2018). These findings suggest that PHEA should be delayed to in-hospital, if possible. Trauma-induced hypovolemia is considered the most common mechanism of injury caused by the blast in the combat environment (Mabry et al., 2012, Apodaca et al., 2013, Reed and Bourn, 2018, Sharpe et al., 2018, Galvagno et al., 2018 & Lairet et al., 2019). Other battlefield-associated mechanisms of injury that may result in hypovolemia include GSW and penetrating causes. The findings contradict the opinion of Davis et al. (2007) that patients who received PHEA benefited from a quicker transit time to the theatre; arguably, the mortality risk outweighs this hypothesis. In UK civilian PHEC practice, PHEA is the most commonly performed critical care intervention undertaken by sub-specialised PHEM doctors (Beaumont et al., 2020, Smith et al., 2019). Crewdson et al's (2018) research

supports the theory that there is a need and patient benefit for a level 8 team to perform

PHEA. However, this is likely to be required for a minority of patients requiring advanced

airway and ventilation interventions. Despite not reaching full consensus these

competencies were used to demonstrate the extended scope of practice an AP could offer

military PHEC within the DMS.

8.3 What work activities do military APs currently perform in practice?

Outlined in table 8.1, data relating to this research question (RQ2) was predominantly

captured within Phase 2, which aimed to understand the current work activities of military

APs and their perceptions and experiences of the AP role. In addition, the study explored

non-APs understanding and experiences of working with APs in a PHEC environment.

The current work of APs was well understood by the non-AP group, gained through

experience of working with NHS APs (chapter 7). Participants noted positive impacts from

their knowledge of NHS APs, drawing on the quality of care provided for patients, cost-

effectiveness compared to doctors, clinical leadership and mentorship of juniors. These

views are replicated throughout the literature (Donald et al., 2013, Fenwick et al., 2020, &

NHS, 2017).

However, for military APs, the absence of an AP role strategy has resulted in a limited

vision of how the military will develop AP roles—leading to variabilities of military APs'

clinical practice and function. Within the literature, inconsistent strategies and policies on

the employment of military APs have directly resulted in stagnation in terms of

development and underutilisation of their role (Blaz et al., 2013; Lewis et al., 2012). The

way in which APs were used often depended on local "Ad Hoc" arrangements through line management. These agreements were then supported through agreed job plans. Participants reported that job plans offer a compromise of military duties against AP development, which provides some protection of their time. However, if the balance is not agreed upon, APs may be unable to fully utilise or develop their skills, leading to job dissatisfaction and role stagnation.

AP participants reported that their autonomy to practise as an AP was more likely to be affected during military deployments than working in the NHS settings. This was attributed to their military chain of command's limited understanding of the role and scope of practice. As a result, restrictions were placed on their clinical practice. They were unable to deliver patient care as an autonomous practitioner. Twine (2017) suggests that the challenges associated with APs often stem from inadequate professional relationships resulting from a lack of role understanding and definition. This impediment is further highlighted by Foster (2023). Inconsistencies in the international definition of APs further compound the development of AP. Carney (2016) emphasises that the absence of international consensus on APs complicates role definitions and acts as a barrier to the global advancement of nurses.

These challenges associated with the lack of role definition and strategy have started to threaten the retention and morale of military APs. Retention challenges associated with the AP role are widely recognised as an ongoing struggle within the civilian sector (Chapter 3) (Mantzoukas and Watkinson, 2007, Jones, 2005, Carney, 2016, Reynolds & Mortimore, 2021), often due to a lack of leadership, strategy and vision for AP

development (Currie and Crouch, 2008, Niezen and Mathijssen, 2014). The challenges surrounding the role of military APs are reviewed in section 8.5.

8.4 Is there a need and value for a military AP in PHEC?

Section 8.4 discusses findings in relation to RQ3 outlined in Table 8.1. Filling medical workforce shortages is one of the key drivers for the development and use of civilian AP roles, partly driven by an evolving ageing population with complex needs and an increase in healthcare requirements (Nuffield, 2016, Nuffield, 2023, RCEM, 2015, HEE, 2018). For the military, it was not about filling medical workforce gaps. The main driver for needing APs in the DMS is different, such as flexibility for operations and workforce retention. Participants from their civilian practice could see value in the role and how it could be extrapolated for military operations. The key reasons noted were clinical experience, leadership, resilience and providing timely care for patients. Participants could see a range of roles for military APs (theme 3 in Chapter 7), which featured along the operational patient care pathway (OPCP) (figure 1.1). Participants highlighted roles where an AP could "plug a gap" in capability, specifically in operations with a large geographical footprint, with limited medical resources, or in a prolonged field care situation. APs were perceived as adding flexibility and could "buy-out risk" when a consultant is unavailable or deemed not required for the level of military operation.

Autonomy was considered key for military APs employed for PHEC operations. A theme that runs throughout the thesis, identified as an important topic from the narrative review and was a frequently occurring concept in the interviews. The literature on AP roles

emphasises role regulation and clear definition as direct contributors to promoting autonomy for APs. In addition, regulation and role definition empower APs and establish a foundation for consistency in patient care (Reynolds & Mortimore, 2021, Carney, 2016).

It seems that the advancement of RCEM credentialing for ACPs and nationalised HEE frameworks has provided standardisation, which has facilitated civilian APs to work to their maximum scope of practice, pushing boundaries within their role. Comparatively, the findings from this study suggest reduced clarity and role definition for military APs continue to restrict their practice, which was exacerbated if they were deployed on operations. Autonomous APs can assess, treat and plan care independently, which benefits patients within the operational patient care pathway, especially in remote geographical areas.

Furthermore, an AP qualified in prescribing offered flexibility for deployed operations. APs that prescribe can access medications outside of the tight constraints of PGDs, providing patients with timely access to medication. For example, enabling earlier administration of analgesia or antibiotics.

Participants perceived a value in APs having additional skills in minor illness and injury, a finding articulated in both the Delphi study and the qualitative interviews. Such skills were considered to provide patients with early access to treatment, enabling military patients to remain in location and continue the "fight". In addition, it was suggested that this could be cost-effective when compared to moving the patient using a medevac route to see a doctor based away from their location. There were differing views on whether APs for PHEC operations should be viewed as a level of skill rather than a role. From Maddry et al,

(2016) paper, it was noted that the advanced set of skills rather than the role provided timely access to critical care for battlefield patients.

One AP participant commented that commanders needed to assess dynamically what is required in a military operation and put the required skill set in place, not just fill the "gap" with a role. D'Angelo et al (2018) notes that future prolonged field care operations will require medical practitioners to have an increased skillet and autonomy. It is suggested that the UK DMS needs to move away from providing deployed medical care with roles moreover look at skills and competence required for that operation. The level of practice should be mapped across to the PHEC levels. Therefore, the AP and its associated skills would be recognised as a PHEC level 6 practitioner. It should be noted that a level 6 practitioner does not necessarily have to be an AP in the military context. This could also be filled by GP qualified to the same skill set outlined.

One of the main advantages to having a level 6 AP qualified in critical care who is working within the level 8 MERT is that it offers the ability to split into two teams so that one team is led by a level 8 accompanied by a level 5 team member, and the other team led by a level 6 (AP) with a level 5 team member. This has several key advantages for operations. The split team concept would be most useful when multiple critical casualties are encountered, which may need transfer by different medevac platforms. It offers the ability to provide care to two anaesthetised patients. In addition, the formation of the team would be able to provide sedation, enhanced airway management and blood administration.

8.5 Challenges for military AP development

From the narrative review, it was apparent that one of the main challenges for AP development is role ambiguity (Jones, 2005., Casey., et al. 2019). Despite the increase of APs roles within the NHS, persistent ambiguity surround's role identity, exacerbated by the absence of regulation (Mantzoukas and Watkinson, 2007; Carney, 2016; Nuffield, 2023). This recurrent theme was noted consistently in phase 2 of the study. The deficiency in regulatory frameworks and clear definitions inevitably leads to variations associated with role identity and practice (Carney, 2016). This issue with role identity, as Twine (2018) highlights, impacted APs being misemployed, working relationships interactions and affected their self-confidence during training.

The interviews identified a lack of role standardisation, definition, strategy, and knowledge that impacted working relationships. Although in the civilian setting this has improved with the standardisation through credentialing with RCEM and HEE. The variation in military roles has led to a lack of understanding by non-APs of the level of clinical practice and associated skills that the APs could provide. This resulted in a loss of credibility, misemployment and reduced trust in the role. The absence of a military strategy and a clear definition of roles has affected APs' career progression and postings to non-clinical roles following AP training. A lack of definition regarding operational utility has resulted in reduced support from the military hierarchy to enable APs to practice. It was apparent that this further restricted the APs development which was now manifesting itself with the retention of APs within the Armed Forces. These wider organisational challenges have been reflected within the literature (Casey, et al. 2019, Reynolds & Mortimore, 2021).

Twine (2018) found a lack of role identity for APs entering practice was an identified

challenge. Both personal and environmental factors influenced the transition into the AP

role. Challenges included restrictions in their job duties due to patient reluctance to

engage with the AP. Additionally, stress resulted from a lack of effective communication

with organisational leadership, impacting institutional support. Twine (2018) concluded

that having a supportive organisation, with effective mentorship and leadership, were key

enablers during the APs transition process.

From the Delphi study and the interviews, some APs felt that doctors were asserting

medical dominance by protecting specific PHEC skills such as PHEA or skills related to

surgical procedures. Indeed, it appears that skills that cross the boundaries of other

professions seemed to be regulated by the professional dominant role, such as a doctor.

From Lawler et al. (2022), it is apparent that when an individual takes on a new role

without change within the organisation, it changes the "status quo", and professional

identity becomes blurred (Lawler et al., 2022). Professional identity dictates the cultural

norms and sets parameters in which certain professions may hold status over the other

(Nancarrow and Borthwick, 2005, Lawler et al., 2022). For example, paramedics versus

nurses or medical professionals over APs. Within these groups of professions, certain

"high status" roles can ensure their role and position are protected by introducing rights or

exclusions to other professions, maintaining exclusivity. This notion is best described by

"Weber's concept of social closure" (Nancarrow and Borthwick, 2005). AP participants felt

certain pre-hospital skills were "ring-fenced" by the medical profession, such as

endotracheal intubation or restricting access to medications, illustrated in a quote by one

AP as "the doctor's bag". Tasks that are more "medicalised" or "specialised" are likely to

come under scrutiny compared to skills that are related to social care needs (Nancarrow

and Borthwick, 2005). Furthermore, within the literature review, there were early

indications of Weber theory with the instigation of RCEM credentialing, which sets

boundaries for the ACP role and brings it under the domain of a medical college. One of

Weber's theories describes the use of social classification through education credentialing

and competencies to exclude other professional groups, bounding practice and in some

cases, it can instigate social closure to that group (Weber, 1978).

Within theme 2; "Trust and personal relationships" the above challenges were explored in

more detail. It was apparent the AP role interfaces with a number of hierarchies across

medical, nursing/paramedic and military dimensions. One participant described the AP

role overlapping into multiple professions, like a Venn diagram. Figure 7.2 presents a

visual diagram of this concept, in which the AP role crosses different professional

boundaries, which in turn can cause conflict concerning role definition. Conversely, the

diagram could also illustrate the versatility the AP role offers. The Venn diagram

presented can be likened to a "spanner" or "interlocking" representation. It illustrates how

the AP skill set can cross over into multiple domains within the DMS workforce. This

interlocking further displays the interoperability of the AP skill set, since APs can overlap

into other roles within the military workforce, bridging gaps, adapting to the diverse needs

of operations and demands of military healthcare.

Figure 8.2 Venn diagram of the Military AP role
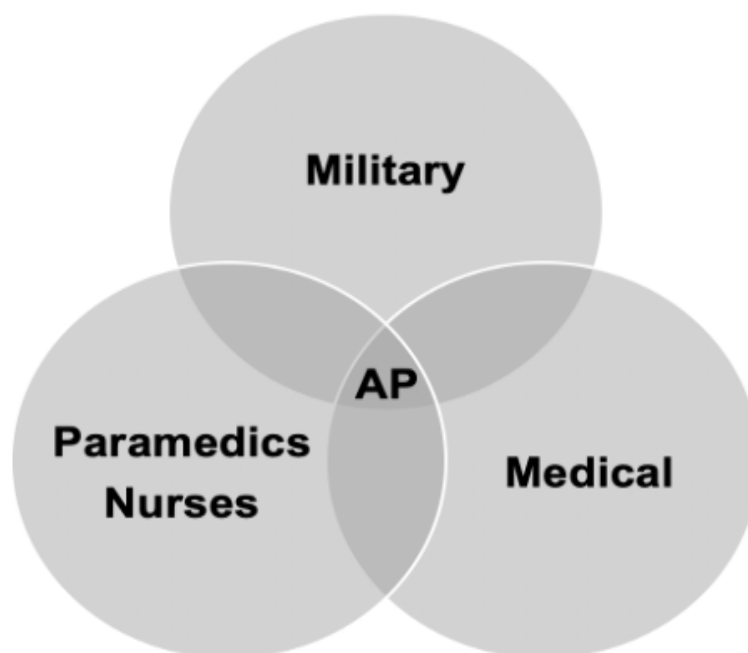
Regardless, it is apparent that the overlapping of professions invariably blurs the lines of

professional identity and exacerbates the above issues (Hardy, 2021). The AP role can be

undertaken by either a nurse or a paramedic. The additional skills afforded through

training overlap in both of these roles and cross into the medical domain. Conflict arises

when these boundaries are not set or defined. When blurring exists, some professions

may view this as an "encroachment" into their professional domain. The additional skills

an AP acquires or are delegated that overlap with other professions can be theorised

under the notion of "horizontal substitution" (Lawler et al., 2022). Kreckel (1980) describes

this as a transfer of tasks and boundaries mutually agreed upon by the other professions.

An example for advanced practice is the ACP role credentialed by RCEM. Building on

Weber's theory concerning RCEM credentialed ACPs, it could also be hypothesised that

the introduction of the portfolio and competencies set the standardisation of a mutually

agreed skill set for ACPs. This could be considered "horizontal substitution". As such,

RCEM, as a medical college, is now able to regulate the scope of practice that an ACP

delivers by setting clear boundaries and standardisation. Regardless of social closure or

horizontal substitution theories, RCEM can dominate and set the agenda for ACPs in

Emergency Medicine. Whether this negatively impacts ACP remains questionable. The

findings from this study suggests that it does positively assist with role understanding,

professional identity and trust, as the ACP role is governed by a recognised institution.

Therefore, the transfer of tasks and boundaries were mutually agreed upon by RCEM and

recognised by the DMS. This seemed to reduce role conflict through mutual

understanding of the role from the multi-professional team. The RCEM ACP now has a

professional identity, and this was widely accepted and supported by phase 2 participants.

Setting boundaries of practice with agreed competence has been highlighted as a positive

step forward.

As well as medical hierarchies, the military also has a hierarchical structure of rank.

Medical Officers hold the highest rank, as the DMS delivers care that is consultant led and

are key stakeholders. This is in keeping with medical hierarchies, where medical

professionals are at the top (Nugus, et al. 2010). Stauss, et al. (1985) describes the

theory of "negotiated order" where different medical professions are reliant on each other

to do their roles. An example would be in the doctor and nurses relationship in ward

nursing, both professions are reliant on each other to look after the patients. However, to what extent dictates the status and power in that relationship.

Therefore, the scope of practice, negotiated order and power of other roles within the DMS is mainly governed by medical professionals placed in influential leadership roles to shape the DMS and inform strategies. Despite the hierarchy and perceived rank gradient from the medical participants, the role of AP was considered advantageous for military PHEC. A range of capabilities was suggested in which the role could be introduced for future operations. Role boundaries and professional dominance from medical Officers perceived at the beginning of the research were not apparent. Are the perceived restrictions from medical Officers for military APs a real or imagined concept? That remains debatable.

Despite the positive ideas for the future employability of APs from the non-AP's views, both groups of participants raised concerns about how the DMS would integrate an AP into its workforce. This was due to several historical failings in managing APs such as ill-defined career pathways, the absence of an AP strategy, lack of operational employment and legacy challenges associated with the employment of military paramedics. It was considered that paramedics and nurses were often "stove piped" in military roles. The roles they were working in were considered restrictive in the workforce. The postings in which they operate were not flexible and limited development. For example, military paramedics cannot work in hospitals, and nurses cannot work in different specialities once they have specialised in an area.

Participants felt that during times of limited operations, there seemed to be a "lag" in

development and the notion that deployed operations drive change within the military.

During times of low deployments, it is considered that the military "regresses" in terms of

innovation and development (Hodgetts, 2014). Identifying the "need" for military APs relies

on specific drivers, and in the absence of active operations, these needs may not be as

"obviously" evident. In contrast, within the NHS, the introduction of the AP role was

prompted by the recognition of medical workforce shortages, complex health needs, and a

demand for professional development (Reynolds & Mortimore, 2021; Griffith, 2008).

Some of these drivers for AP development do exist within the military. However, some

participants felt they could not find an immediate need to develop military APs; due to the

lack of military deployments in which they would be utilised. It is well known that military

operations drive through rapid developments due to necessity (Hodgetts, 2014).

Understanding and identifying the need for an AP is considered key. This study has

demonstrated that the "need" and "drivers" for AP development differ from the civilian

requirements.

Lastly, resistance to developing APs was noted, this was due to competing agendas from

each of the three services. It was felt that the Army, Navy, and RAF had not given clear

direction on developing APs. Some confounding factors included varying role terms and

different requirements for APs for each of the services capabilities. From the interviews,

there were a range of AP titles currently in use; ACP, ANP, CCP, APhecP, MNP, GP

Nursing Officer & NP. These factors compounded role ambiguity, introducing an additional

layer of complexity, as noted by Hardy (2021). The examination of AP roles in Hardy's study revealed variability, ranging from "highly specialist" to "more generalist roles" among HCPC clinicians employed in the NHS. Moreover, the intricate and rapid development of APs across different organisations and a lack of collaboration further amplifies the variations associated with the role (Hardy, 2021). Hodgetts (2014) suggests that collaborative efforts are imperative for innovation to thrive within the DMS.

8.6 Conclusion

This discussion chapter has drawn upon findings from the literature review and compared and synthesised them with Phases 1 and 2 results. The chapter has used the research questions as a framework to undertake the mixed methods analysis. Employing the research questions as a framework facilitated a holistic connection between the findings and the posed questions. As such, several key conclusions are apparent from this triangulation phase. The chapter examined the required skills for PHEC at level 6, highlighting areas of contention and non-consensus competencies among practitioners. In addition, the absence of a DMS AP strategy was a central theme. This impacted the development of the military AP role regarding autonomy, retention, and career progression.

Despite the challenges associated with the lack of a DMS AP strategy, a distinction appeared in the motivation to develop military PHEC APs compared to their civilian counterparts. While civilian APs were developed to address the medical workforce gaps, the driving force behind military AP development is to meet demands along the

Operational Patient Care Pathway, specifically in providing advanced PHEC care. This

requirement was emphasised for remote operations, where APs can provide invaluable

contributions by ensuring timely access to skilled care. However, before integrating APs

into the workforce, addressing challenges associated with role identity and its alignment

within the medical and military hierarchies is crucial. The absence of clear role definition

and standardised role terminology significantly impedes the progress of AP development.

The subsequent chapter will present recommendations for the military's potential

introduction of PHEC APs within the DMS. These recommendations, grounded in the

findings from the mixed methods analysis, will play a pivotal role in overcoming the

identified challenges and ensuring the successful implementation of military APs for future

PHEC operations.

Chapter 9: Recommendations for implementing a military AP role.

9.1 Introduction

Following the discussion of the findings in the previous chapter, this chapter will now present recommendations for implementing a military AP role before outlining future practice and policy implications.

The findings from each phase of the study supported the introduction of APs for military PHEC. However, the "need" for military APs differs from the civilian experience. The future of modern warfare will be diverse. Since the beginning of this thesis, there has been a global pandemic (from 2020) and a war started in Ukraine (from 2022). Both events have generated casualties whose clinical presentations have differed from previous military operations, for example, in the Middle East. From Bricknell et al. (2017) lessons identified from Iraq and Afghanistan, suggest that future operations will be austere and diverse, and are likely to involve paediatrics, humanitarian patients and prisoners. The paper recommends that the DMS will need to be flexible and dynamic to respond to rapid changes in operations requiring collaboration with international Armed Forces and humanitarian organisations (Bricknell and Nadin, 2017). This places a further challenge on the DMS to modernise its workforce to ensure it has the right people who are skilled, trained, experienced and ready to respond.

Indeed, the recent Integrated Review published in March 2021 outlines the requirement for a sustainable workforce which utilises talent and skills (von Busch and Palmås, 2021). In

addition, the Defence People Strategy, published in June 2022, states that future

challenges associated with warfare will need to be met by an "investment of people

developing innovation and skills" (MOD, 2022).

The AP role may contribute to meeting the logistical challenge of ensuring that patients

can promptly access the necessary medical care along the operational patient care

pathway (OPCP). Given that the main concept of this pathway aims to deliver a patient

towards an incrementally increasing clinical care provision, APs can help to bridge the

"gaps" in care provision along the pathway (Bricknell, 2014). As discussed in chapter 2,

future operations are likely to be prolonged; therefore, an AP would help meet the needs of

patients for timely care provision. Throughout the study, a recurring theme was the notion

that APs would be key to providing clinical care in these scenarios.

9.2 Introduction of AP for military PHEC

Military organisations are often characterised by bureaucracy, featuring multiple layers of

hierarchy contributing to complex decision-making processes. This complexity can result

in significant delays when implementing changes, as approvals must navigate through the

organisation and its hierarchical levels. In top-down organisations, such as the military,

instigating change can be particularly challenging. The hierarchical decision-making

structure, where decisions primarily come from higher-ranking officers within the senior

leadership team, can create a disconnect lower down in the organisation. This disconnect

can hinder change, especially when there is a lack of understanding of the need for

change (Longenecker et al., 2014). For instance, when nurses have transitioned into senior leadership positions, delivering nursing strategy may not have worked in clinical settings for a significant period. This may indirectly contribute to this challenge of disconnect in the tactical environment.

The introduction of APs within the DMS could potentially overlap with existing roles, altering relationships within the workforce and introducing a different power dynamic (Lawler et al., 2022). Furthermore, the limited understanding of this role within the organisation further complicates its introduction into the workforce. In addition, bureaucratic organisations tend to resist change (Kotter, 1995). Overcoming these challenges is crucial if the DMS intends to successfully introduce APs into its workforce. Kotter (1995) emphasises that delivering organisational change necessitates a shared vision, a clear rationale, a well-defined plan, effective communication, empowerment, and a sense of urgency. This sense of urgency creates momentum, which, when coupled with strong leadership, can drive significant changes.

If the DMS chooses to invest formally in developing APs, this study recommends that it should align with a national framework such as the HEE AP strategy or RCEM curriculum. This was a clear theme mentioned with Phase 2 and noted in the literature review. This would ensure APs are standardised using an advanced practice apprenticeship alongside a credentialing programme. The HEE programme has evolved following transitioning through the early issues such as role identity, career pathways and utilisation which are now manifesting themselves within Defence. Adopting the HEE strategy should mitigate

some of the issues associated with role identity, boundaries and variabilities of standardisation that were identified by the APs and non-APs interviewed in this research. The thesis has highlighted the importance of "trust and personal relationships" within teams that could be nurtured by greater shared understanding of the role and its scope of practice. In addition, it may also help to ensure there is "buy-in" from stakeholders within the DMS, providing credibility for the role. Although there has been progress from HEE and RCEM to standardise the role through credentialing, this is voluntary. In addition, it should be noted that AP titles remain unprotected and are not formally registered by either the HCPC or NMC (King et al, 2017). From the literature review it was found that where internationally the role had been formally regulated, such as in the United States America, this was shown to provide consistency and buy-in from other medical stakeholders (Fealy et al, 2018, Foster, 2023).

In absence of any formal regulation, If the DMS collaborated with HEE it would assist with developing APs through an established program and may avoid having to relearn the same lessons as the NHS.

A key theme from the interviews highlighted the absence of a DMS AP strategy with stakeholder agreement from all three services. As the international development of AP progresses, transition programs are strongly recommended to be grounded in a well-defined AP strategy. This strategic foundation is crucial for clarifying roles, establishing boundaries, and ensuring a cohesive approach to the evolution of Advanced Practice (Reynolds & Mortimore, 2021).

Prior to establishing the AP role within military PHEC, it is vital to ensure that key stakeholder engagement is generated. This will facilitate a shared understanding and confidence in the role prior to its implementation. Accessing an AP apprenticeship through HEE is proposed as a valuable approach for identifying suitable educational supervisors, establishing effective management structures, and providing essential support for trainees. This suggestion was supported by the work of Reynolds et al. (2021), which emphasises that partnering with HEE offers a structured framework, clinical supervision, and peer support for trainee ACPs.

Following investment from the DMS, APs should be recognised as their own workforce in having a unique and clearly defined professional identity, with roles and responsibilities that do not blur the lines into other military AHP's non-clinical roles, which are unrelated to advanced practice. This would ensure APs are protected to deliver clinical care within their advanced scope of practice and reduce skill fade after training.

Recruitment and selection of AP trainees

Recruitment and selection of AP trainees must be robust to ensure the "right level" of nurse or paramedic is selected. A theme in this study is the notion that APs have a diverse mindset, coupled with military nursing/paramedic experience and credibility. Consequently, the study suggests that individuals undergoing AP training should possess a sufficient amount of military experience, as it is perceived to enhance their overall credibility. In addition to military experience, selection should also consider the multiple dimensions of advanced practice set out within HEE Advanced Practice Framework (NHS,

2017). HEE AP domains include; clinical practice, leadership, education, and research
(NHS, 2017).

Following the selection of trainees, APs will need to have job plans that safeguard their
education and clinical time. From the APs interviewed variation in job plans, career
management and non-clinical postings after training impacted their ability to operate as
APs for deployments. In addition, to a job plan their role must be underpinned by a
clinical-facing AP role. It was highlighted within the interviews that current military APs find
securing clinical and academic time through a job plan challenging due to other
requirements in their non-AP role such as military, secondary duties and military-specific
training (weapon handling, security briefs, pre-deployment preparation courses). A
specific AP job plan would enable military PHEC APs to complete the level 6 competency
sign-off as recommended by Thompson et al. (2022) and balance the needs of the service.

9.3 Recommended training and competencies for military APs to operate in the PHEC environment.

Throughout this thesis, from the literature review and in both phases of the study, it was
highlighted that APs must be trained at MSc level. This is further recommended by HEE,
(2017), and Reynolds, et al., (2021). In addition to academic training, AP's clinical practice
should be demonstrated through an assessment of competence. This was further
supported by a recent article reviewing capabilities for deployed PHEC, in which to be
recognised at PHEC Level 6, competencies are now required (Thompson et al., 2022).

Although the exact breakdown of the competencies was not fully defined in the paper, it was suggested that they should include ketamine sedation, advanced airway management for cardiac arrest and the use of blood products.

From the interviews presented in this research, participants felt the civilian equivalence for PHEC level 6 was a CCP; this is further supported within the literature (Thompson et al., 2022). Upskilling military nurses and paramedics to work in an AP role at PHEC level 6 was considered akin to a CCP (Thompson et al., 2022). Findings within the literature review demonstrate that in the absence of a sub-specialised PHEC doctor, UK civilian pre-hospital care delivers critical care interventions with the use of Specialist Paramedics known as CCPs and a number of nurses who work in similar roles. As discussed in Chapter 2, these practitioners can deliver a range of enhanced skills associated with level 6 practice. CCPs undertake a robust training programme specialising in advancing practice alongside recognised modules at MSc level on Advanced Practice. However, nationally, the role is not standardised, and as a result scopes of practices differ. Despite this, these roles have a proven model of care associated with positive patient outcomes (Hughes, 2011, Jashapar, 2011).

For clinicians to operate at PHEC level 6, a training pathway for practitioners needs to be explored. A CCP-based model of training for military nurses and paramedics could be a solution to meet the challenge of providing level 6 care autonomously. Despite the lack of standardisation of national CCP training, the Delphi results provide the provisional competencies for level 6 practice which a CCP model of training could be tailored against, developing a bespoke military AP for PHEC level 6. This suggested training pathway may

provide a role with a skill set required to bridge the gap between a level 5 and 7,8 PHEC practitioner. The finalised draft of level 5 and 6 PHEC competencies are located in the appendix 11. This document was produced to provide an overview for the senior leadership and line managers on the clinical and non-clinical capabilities for level 5/6 practice. Within the document are the recommended assessments that can be used to provide competency sign-off. However, the lack of standardisation for AP training remained a challenge, using a bespoke training pathway may well exacerbate this issue. Although there was some debate that military APs should have bespoke competencies for military PHEC, possibly loosely based around the above national competencies with additional military PHEC competencies added. Currently, to achieve level 6 status, clinicians must have successfully undertaken the Diploma in Immediate Medical Care Exam and completed two years of experience working at PHEM level 5. The Diploma Immediate Medical Care exam is designed to assess practitioners' ability, including doctors, paramedics and nurses, in their recognition, diagnosis and management of different presentations in the pre-hospital environment (Porter and Steggles, 2005). Administration of inotropes and blood is not covered (Porter and Steggles, 2005). Before taking the exam, candidates must have evidence of pre-hospital clinical exposure, and it should be noted that the requirements vary for different roles. The additional advanced competencies proposed by the Delphi study as requirements for level 6 may question the current preparation for level 6 practice as; level 5 experience of 2 years and the Diploma Immediate Medical Care exam. The Diploma Immediate Medical Care exam is designed to assess the ability of practitioners, inclusive of doctors, paramedics and nurses in their

recognition, diagnosis and management of different presentations in the pre-hospital

environment (Porter and Steggles, 2005). The syllabus includes a section on the 'general

knowledge of sedation pharmacology, however, does not cover or examine the clinician's

ability to safely perform some of the PHEC level 6 procedures identified in this study

(Porter and Steggles, 2005). These include procedural sedation, administration of blood,

inotropes, and paralysis for post-cardiac arrest care.

Lastly, if the DMS invests in training to the level 6 competence proposed by the Delphi

study, there is a requirement for the DMS to move away from the notion of "course equals

competence". Participants raised this issue as problematic as there needs to be a

recognition of training and then clinical consolidation to achieve competence.

From Phase 2, participants considered that national competency frameworks such as

RCEM or the FPHC curriculums were a solution to provide standardisation. APs should

be accredited with the above curriculum to ensure they are current, standardised and,

therefore, credible to practise on deployments. A bespoke training option may not provide

the level of standardisation to avoid issues associated with civilian CCP practice, such as

variabilities with scope of practice and skill set.

9.4 Timescale and length of training

The MSc in Advanced Practice course when undertaken on a full-time basis is three years

in duration. However, Defence will need to consider the appropriate timeframe for

credentialing, consolidation of training and completion of level 6 competencies.

Credentialing and competency sign-off were mentioned in both phases as an integral part

of AP training. The training pathway needs to be protected through a job plan and

supported with a clinical-facing role in a fixed geographical location. It is likely that the

above pathway would take 5 years to complete. Timescales will need to be considered

against military commitments outside of clinical work. However, if deployments are

factored in against low intensity periods of training this would be feasible. Much like the

medical Officers, contingent planning should allow for a period of return to clinical service

after prolonged deployment with limited clinical exposure. This will mitigate against skill

fade, a concern raised during Phase 1 and 2 of the study.

9.5 Licensing/regulation/accreditation

Trainees and qualified APs remain under the professional regulation of their base

profession (HCPC/NMC). There is no separate professional registration for APs. As

autonomous practitioners, APs continue to hold professional responsibility for their actions,

ensuring their minimum clinical hours are adhered to whilst maintaining clinical

competency. During training, AP's clinical portfolios are set by either HEE or a medical

college offering an AP curriculum with a credentialing scheme such as RCEM. For PHEC

APs, it is recommended that this would likely be with the FPHC alongside the specific

Defence PHEC competencies agreed upon from the Delphi study. Furthermore, the

portfolio and competencies should be digitised using apps such as "CPDME™". This will

enable remote supervision when military mentors or APs are geographically dislocated due to military deployments.

Further work has begun to understand if the internal clinical courses run by the DMS, such as MERT or Battlefield Advanced Trauma Life Support courses and if these could be mapped over to the civilian curriculum. This will enable recognition of clinical pre-deployment training to be used for sign-off of competence. If the above mapping work was endorsed by RCEM, it would enable military APs to continue working towards AP accreditation whilst preparing for their deployed roles, negating the need for delays in training or unnecessary duplication of courses.

9.6 Training and support for the AP role

The collective opinion from the participants is that PHEC APs should be trained for specific military operations requiring specialist PHEC level 6 skills using a blended approach of military training underpinned with a national curriculum and clinical exposure. Training should be inclusive of musculoskeletal injuries and critical care. Participants felt that the training should be alongside continuous clinical exposure. The need for continuous clinical exposure was highlighted by Lairet et al (2019) study, noting that reduced clinical exposure was found to have been associated with clinical errors during deployment (Lairet et al., 2019).

During the deployment of military APs to remote settings without the supervision of a medical Officer, advances in technology can be employed to support APs on operations.

This was recommended in the interviews from participants seeking to support the APs in remote locations. The use of telemedicine, such as the "Pando app™" could be employed to provide remote support (Naumann et al., 2022). Pando was trialled from Jun 2019 – Feb 2022. The app features an "ask advice" option where deployed clinicians can contact various consultant specialists inclusive of dentists, dermatologists or orthopaedics in the UK. It facilitates "medical in confidence" discussion and supports sending clinical images. The Pando app was found to offer a secure mobile-based app to provide "reach back" for remote clinicians. It was concluded that this app may offer a "force multiplying" effect for the deployed DMS by minimising the footprint of deployed specialist clinicians. Furthermore, the Tempus Pro™ vital signs monitor, which is currently in use by Defence, can provide telemedicine support. These platforms, combined with the AP digital portfolio/competencies, ensure APs can access support and supervision worldwide.

Finally, once military APs have been established within the DMS, during peacetime APs will need to be employed and supported with an honorary contract from their host NHS Trust during their 5 years pathway and adequate clinical supervision. The job plan and contract must ensure that the role is protected from other non-clinical military commitments. Reynolds, et al., (2021) comments that providing a "high standard of clinical supervision" within a supportive organisation facilitates autonomy and development. Lawler et al,. (2022) consider AP supervision as a crucial element in their role development. Described as 'essential' in developing proficiency as an AP, facilitating a supportive transition into the role. The absence of effective clinical supervision can lead

to an extended training period, a shortfall in reaching goals, and higher rates of dropout.

During their training and on clinical placement, Twine (2016) suggests that the investment

from a "good physician" mentor contributes to building confidence during the training of

APs. Reynolds, et al., (2021) found that providing effective clinical supervision supports

and empowers APs clinical decision making.

In addition to their clinical pathway, military APs will need to be aligned to new terms of

service. Importantly it will need to ensure that military pay is competitive with other

employers, linked to Agenda for Change, as civilian APs are paid at grades 7/8, which

equates to up to £54,619 top band 8 pay (Careers, 2022). Current terms of service for

military nurses and paramedics are limited to rank; therefore, lower-ranking military APs

would likely be paid more in the NHS. Pay needs to be separated from rank and mapped

across to the NHS to ensure parity and retain military APs post-training.

9.7 Recommendations for future research

Following the introduction of military APs for PHEC, research is required to demonstrate

efficacy within the workforce and further knowledge on the impact of APs. Previous

studies on this subject are from operations in Afghanistan measuring the effectiveness of

APs in PHEC, Role 1 & 2 environments using low quality evidence. Additional research is

required to assist DMS stakeholders on how an AP could be employed in PHEC and other

specialties such Aeromed, Role 3 or Primary Healthcare.

The role of the AP needs to be prospectively measured against KPIs utilising a mixed methods approach to truly assess its impact on deployments. In the absence of current deployments other exercise areas could be utilised. For example, where APs have deployed to British Army Training Unit Kenya as a level 5 PHEC practitioner this could provide an opportunistic case study setting for an observation study. However, measuring the impact of an AP with real patients could present ethical issues for the DMS. An alternative option could be to utilise simulation. Linking with the MERT "mixed reality simulator" project which uses virtual reality to provide high fidelity simulations would facilitate a setting to test the concept of APs for PHEC operations and generate additional data in this area (Stone et al. 2017).

9.8 Conclusion

This chapter has presented recommendations for the DMS regarding the introduction of APs for military PHEC. It is important to note that the need for APs in military PHEC differs from civilian requirements, which primarily aims to address medical workforce shortages. In the military context, APs can offer a solution to meet gaps in capability along the Operational Patient Care Pathway while providing nurses and paramedics with a clinical-facing career.

Based on the findings of this PhD study, the following recommendations are made for the integration of APs in PHEC within the DMS. Firstly, in terms of scope of practice: Military APs in PHEC should be trained to perform the following advanced skills, including,

advanced airway procedures, advanced life support, blood administration, and the

administration sedation using ketamine. These skills have been recommended for

providing level 6 care in challenging and remote operational environments.

Secondly, it is vital to provide military APs with additional training and support to ensure

competence and confidence in their roles. A well-defined strategy should be in place to

protect and promote the successful implementation and integration of APs in the DMS.

Developing career pathways for military APs is essential to ensure retention and

professional development. This includes addressing the challenges related to role

definition, their role within hierarchies, and variations in practice and titles.

Lastly, the thesis identified opportunities for future research to address gaps within the

literature and research area. Suggestions include employing prospective studies, either in

a case study setting or using simulation, to further measure the effectiveness and impact

of military APs in PHEC settings with patients. With these recommendations, the thesis

will now move onto the last chapter, which will present the overall conclusions drawn from

the study.

Chapter 10: Conclusions

10.1 Introduction

This chapter firstly presents the strengths and limitations of Phases 1 and 2 of the study.

This involved a critical assessment of the research design, data collection methods, and

the validity and reliability of the findings. Following the integration of Phases 1 and 2, the

chapter discusses the potential impact of the PhD and the dissemination of the work,

exploring how the research contributed to the existing knowledge of APs in military PHEC.

It highlights the potential implications and applications of the research for policy, practice,

and future research. It then presents a reflective account exploring my journey during this

research programme. This reflection explores the challenges, insights and learning points,

discussing how the research journey has influenced my understanding and perspectives

on the topic. Finally, the study concludes summarising the key findings, implications, and

contributions of the research.

10.2 Strengths and limitations of the study

This section assesses the strengths and limitations of Phase 1 and 2 of this study. It

explores the main limitations, including biases, limits of the Delphi questionnaire, and the

impact and experiences of using semi-structured interviews with military personnel.

Phase 1 – Delphi Study

This is the first Delphi study that has explored military competencies required for PHEC operations within the DMS. The study carefully selected a panel of SME experts, with a minimal attrition rate (n=1) achieved throughout the 4 rounds. In addition, this study was further supplemented with qualitative work, through short answer boxes and interview questions. Although full consensus was nearly reached (69% out 70%), further detailed qualitative findings provided rich data for the study. The findings from the Delphi study has begun to open the narrative on a range of pre-hospital skills for military PHEC. Powell (2003) suggests that transparent justification in the decisions made for the Delphi study outweighs the requirement to secure an exact 'scientific' consensus, and further research could be required. Previous Delphi studies using empirical methods that have not reached consensus have presented their results to enable readers to conclude their findings (Powell, 2003). It is intended to publish the findings of this Delphi.

The main limitations of this study included difficulties in interpreting differing opinions in the responses. This was offset by using open ended questions during the study and analysed using a content analysis method to understand the conflicting opinions. The reasoning for the confusion around the skills was likely to be attributed to the lack of context or definition associated with the competency statements. For questions in round 3, there was a minor refinement to add additional clarity. This additional clarity aided the participants to respond to the questions where there had been confusion regarding the definition of the competency. It is important to note there were no additional contextual elements added to the questions as this was considered leading and would have added bias. For example,

the context of when the competencies would be required, for example, battlefield or civilian setting, was not suggested and neither were the roles that should undertake PHEC level 6 care.

A further amendment was to the Likert scale which was adjusted in rounds 1 and 2. This adjustment was made to provide a more precise response to each competency. The adjustment aimed to ensure the responses were specific without altering the context of the research question. It was felt that offering a clearer Likert scale enabled participants to provide a more accurate response and capture the perspectives for each competency without inferring bias while still maintaining the integrity of the research question. From rounds 1 and 2, it was clear from the short answer comments that there were issues regarding underlying assumptions about whether a competency should be considered a skill in a military environment. Therefore, it may have resulted in interpretive reasoning from the participants, seen when the individual uses their own experience to 'interpret' the question and to contextualise the requirement for the skill to be used in deployed pre-hospital care, thus leading to inconsistency and subjectivity in terms of reaching consensus.

It should be noted that the FPHC competencies were published in 2017 and are civilian based; therefore, some items may be considered inappropriate for the deployed environment. Despite this, and the absence of battlefield-specific pre-hospital competencies, the curriculum was chosen as the 'best fit' for the Delphi instrument. In addition, sub-speciality military PHEM doctors (levels 7 & 8) training is taken directly from the FPHC curriculum. Following round 1, the items were adjusted with further definitions

to help reduce some ambiguity. For rounds 3 and 4, a comprehensive definition was given to ensure consensus was reached and focus the participants on PHEC level 6 skills. An additional limitation was a cognitive bias that was evident from some participants who rapidly completed the questionnaire, possibly resulting in 'short-cutting' elements and ultimately leading to a lack of consensus in some areas.

Lastly, a limitation noted was a reduction of a participant seen in subsequent rounds. One response revealed that a participant had since left the Armed Forces. However, compared to other Delphi studies, the sample was relatively large, with a good cross section of experts from a range of clinical backgrounds. A weakness of using the PHEC subspecialty board is that each role may have its own agenda. This was evident in a comment regarding paramedics versus "in-hospital" nurses, it could be argued that this participant was asserting professional dominance. Other comments regarding the lack of PHEC continuous clinical exposure were also mentioned. These opinions, although outside the aims of the Delphi questions, provided valuable insights. In addition, it is suggested that the participant wanted to table items of their own agenda, using the Delphi study short answer boxes to express their opinion on wider issues. However, despite the above limitations, the Delphi study has outlined various skills now required for military PHEC level 6. Further research will be required to inform training pathways to prepare individuals for PHEC level 6 duties safely, whether that be a GP, paramedic or nurse.

Phase 2 – Semi-Structured Interviews

The qualitative elements of the study have generated important findings that have begun to shape how APs could be brought into the DMS. The themes have explored the current understanding of the AP role in Defence, how they could be employed and the associated challenges. To date there has not been a study in this area where the findings have provided a novel contribution to military AP for UK PHEC.

The main limitations for Phase 2 of the study were associated with challenges from the COVID-19 pandemic. The sample size was smaller than expected (12 out of 23 non-APs and 10 out of 12 APs). However, there was a good level of diversity of clinical backgrounds, experience, roles and military rank in the sample. This was achieved with both phases of the study. Therefore, data saturation was reached and combined with the Delphi study was able to answer the research questions. This was determined from an estimation at the start of the study (target 24 participants), practical considerations (clinical shift timings, deployments, time to complete the PhD) and lastly the method that took primacy to judge saturation was done through thematic analysis.

Of the AP participants, 12 were invited, and 10 were interviewed. From the non-AP group, 23 were invited, and 12 were interviewed. This was due to several factors. From both groups, the sample was drawn from clinicians who were mostly working full time in the NHS or deployed on military taskings supporting the COVID-19 response. Guest et al., (2006) suggest that if the sample is homogenous and concerns a group with specific expertise, then a sample size of 6 to 12 is considered adequate to reach saturation.

In addition, the COVID-19 pandemic impacted options on where the interview could be conducted, face to face or virtual. During the time of the interviews, the UK was in lockdown. This resulted in three face to face interviews; the rest were conducted using virtual means. Virtual interviews can have a few disadvantages. Opdenakker (2006) comments that virtual interviews can impact gaining an effective rapport with the participant. Assessing body language can be problematic. In addition, there is a risk of loss of information, as virtual interviews can be shorter and perceived as being less in-depth. However, this was not the case for this study. The culture of in-depth remote working due to COVID-19 meant that these perceptions of video interviews were likely largely dispelled and the method is seen as broadly an effective and practical counterpart to in person interviews.

Some of the main advantages of conducting virtual interviews include flexibility in interview location. Skype interviews can be undertaken in any geographical location, depending on internet connectivity. For military participants, this was advantageous as the interview could be conducted whilst the person was on operational duty. Skype can promote a comfortable setting, as people can have the interview at home and out of military uniform. As mentioned previously, for military participants, a setting of the participant's choosing can mitigate issues associated with power and relationships, which is noted to be more prevalent with military participants (Opdenakker, 2006, Bernthal, 2015).

10.3 Implications for Policy, Practice and Research

APs offer a range of opportunities to improve continuity for peacetime roles and along the OPCP. The role offers a rewarding patient-facing career for nurses and paramedics wanting to remain clinical-facing. Furthermore, it will facilitate reservist APs which are currently considered under-utilised, which was a clear theme within this study. In terms of strategic workforce planning within the "Defence People Health and Wellbeing Strategy - 2022 to 2027", calls for an analysis to determine where the "gaps" lie in workforce planning to ensure Defence anticipates the needs of future operational requirements (MOD, 2022). It is recognised within the document that warfare is changing, which demands different expectations of the workforce, and that Defence now needs to evolve to meet these challenges. In addition, a strong theme to meet these challenges is investing in people. This will be achieved through a range of initiatives, including training the workforce in new skills to ensure it can achieve success in operations. Furthermore, it is recognised that the current generation and moving into the future, people within the workforce demand different things from their careers within the armed forces. This includes being valued and remunerated in pay, with developmental opportunities. The document moves on to discuss how it will achieve the above through a range of initiatives, including collaborating with governmental organisations such as partnering with Health Education England.

Moving forward, the findings within this PhD combined with the Defence workforce strategy will need to review the workforce breaking down the required Defence Lines of Development (DLOD) delivered by the DMS medical operational capability teams. This review should be undertaken by partnering with HEE. This will ensure that the DMS can

fully identify areas for change in its delivery of future roles, such as AP. The DMS will need to look at skills differently. In practical terms, this entails moving away from a culture of "course equals competency", which was found as a theme during Phase 2. Workforces will need to be flexible to adopt new ways of tailored training to upskill and ensure its people are fully optimised to their full potential. This will be achieved with a range of new approaches and thinking in the future development of nurses and paramedics. Workforces will need to be "unlocked" to ensure that APs in the reserve and international forces are fully utilised with an emphasis on operations.

A clear theme from the study was the lack of high-quality evidence on APs for PHEC. Several different perspectives were used to explore military APs for PHEC for this mixed-method study. Despite the limitations of the available evidence, the findings can be used by key stakeholders to begin to consider how to utilise APs within Defence. Due to the lack of quality research on military APs in PHEC, it is recommended that further research will be required to evaluate their impact within the DMS after the establishment of the role. This research needs to measure patient benefit, retention of AHPs/nurses, employment, and cost-effectiveness. Research in this area will provide clarity and assist stakeholders to answer questions during the development of APs in other areas, such as primary healthcare or critical care within the DMS workforce.

10.4 Dissemination and impact of the PhD study

Dissemination of work from a PhD is widely accepted as important (Grand et al., 2015). Since commencing this PhD, I have been invited to speak at various conferences, both national and international. These included Defence and Security Equipment International (DSEI), Tri-Service Emergency Medicine, RAF Nursing, Portuguese Military Nursing, and Health Education England Advanced Practice Conferences. This enabled the networking and promotion of APs in the UK military. I published in the Military Health BMJ entitled "Is there a role for an advanced practitioner in UK military pre-hospital care?" (Paxman et al., 2021). This opinion article opened the narrative on the topic. The agreed competencies have also resulted in a draft publication of the Defence PHEC competencies for level 5-6 (Appendix 11), which are currently being staffed to be fully endorsed and adopted by the RAF. The competencies will provide standardisation of PHEC clinical practice mapped over to the Defence PHEC levels. Lastly, the findings of the PhD have contributed to the RAF Forward Aeromed Working group, which has agreed on a 5-year strategy for the capability. This has included the addition of an AP on MERT. This work has contributed to the production of the draft AP career framework for the DMS (appendix 12) and a review of a separate pay spine paper for APs. Lastly, in terms of using standardised titles for APs, highlighted as a challenge in Phase 2, a briefing paper has been submitted to the DMS (appendix 12). In addition, two articles have been drafted for publication later this year, these include publishing findings from the Delphi and Interview phases of the study within the BMJ Military Health. This journal has been targeted as papers are circulated throughout the DMS and therefore has the most relevant target audience for this work.

10.5 Reflective account of my journey

When I started this PhD, it followed on from my MSc research on Advanced Practice. Already fully invested in the subject, I believed there would be a potential role for Advanced Practice in the DMS. However, with limited research in the area, I felt that my PhD needed to deliver data to support or dispute this hypothesis. As the Advanced Practice lead for the RAF, I had already set up a role within the RAF Hospital Staging unit and a training pathway for trainee APs.

The Army and Navy had also made significant headway with AP roles. However, I could already see the challenges, such as the absence of a policy, lack of standardisation, absent training pathway and role conflict beginning to manifest themselves. This resulted in stagnation in terms of development. It became apparent that AP roles were going "in and out of fashion". These issues impacted the retention of newly trained APs, losing colleagues who sought employment within the NHS due to a lack of development and management of their new role. In addition, APs, both regulars and reservists not being utilised on operations due to no formalised operational roles. I was watching their expertise being overlooked which in turn increased frustration.

As a result, it fuelled me to deliver this research to ensure that the notion of the requirement for AP in the DMS was fully explored. My role as a military Officer inherently puts me in a position of leadership and, to some degree, influence. Having established AP within the RAF, I felt it was incumbent on me to ensure this subject was researched fully to ensure the profession of AP was advocated for, and its role better understood.

Undoubtedly my military role as an AP, and my preconceived ideas about the potential value of the role, were likely to impact the research as an 'insider'. Mindful of personal bias, it was fundamental that this was mitigated. I utilised supervision sessions from experienced and independent professionals and remained reflective and alert to personal bias throughout. My positions would have been most likely to impact during the interviews in Phase 2. I needed to ensure that the research was dependable and credible. Throughout the study, I remained transparent to ensure that all sides of the arguments were analysed and considered.

During the COVID-19 pandemic, this indirectly assisted with facilitating virtual interviews, reducing the effect of military rank. It was never my intention to conduct virtual interviews; however, this method was useful in mitigating several issues that insider research can affect.

Having an in-depth understanding of the context assisted with drawing out data that I had not previously explored. Several topics changed my initial perceptions of APs in the military. Namely, the drivers and our requirements for APs are different and nuanced compared to the NHS needs. It is not as simple as thinking the military needs APs to be a solution for medical workforce shortages.

In addition, how Medical Officers understand APs and concerns over prejudice against the role. This was not the case among the PHEC SME doctors, some of whom have been huge advocates for AP roles with visionary utilisation of AP roles within the workforce.

This resulted in an ontological change of thought from my initial assumptions of what I expected the findings to be.

In conclusion, my research has generated new knowledge, and I have aspired at every turn to be transparent, objective and truthful, in providing a detailed and useful study of the subject. The findings can now assist decision-making for senior leadership within Defence to consider where APs could be employed within the DMS workforce. This research has already been implemented and provided tangible benefits for military APs in how they will be employed—moving the subject towards formally developing AP within the DMS.

10.6 Novel contributions

Before starting this study, which aimed to explore the potential role of military APs in deployed pre-hospital operations, it became evident that a significant research gap existed in this area. This gap was first identified during my MSc programme and while conducting preliminary background research before commencing this PhD. An additional gap was noted within the DMS workforce in the form of an untapped resource of trained APs. Although the DMS had trained APs, their deployment within a defined role was not identified. Their scope of practice and the specific areas within the PHEC environment where they could be effectively employed had not been strategised.

Moreover, despite the evolving nature of military healthcare deployments, ranging from challenges associated with prolonged field care and humanitarian missions, the requirement for an AP was not formally addressed by the DMS.

The study has demonstrated that the introduction of APs to military PHEC could have a multitude of advantages for the DMS. Research findings suggest that one of the potential advantages lies in the capacity to bridge capability gaps throughout the Operational Patient Care Pathway. AP roles within Role 1 and 2 treatment facilities could contribute value, particularly in prolonged field care scenarios, the transfer of critically unwell patients, or enhancing the capabilities of a level 8 MERT, thereby providing benefits for the DMS workforce. Furthermore, the role offers nurses and paramedics advanced clinical skills and an established clinical career trajectory supported by a comprehensive strategy for growth and development. The upskilling of nurses and paramedics with advanced skills recommended by this study, tailored for PHEC Level 6 care, offers several advantages. This enhancement in skill not only elevates the overall effectiveness of care delivered in remote operational environments but also ensures that patients receive timely access to critical treatment, effectively bridging identified gaps arising from prolonged field care operations (DeSoucy et al., 2017). Furthermore, the autonomy granted to APs in these environments has the potential to "buy out" risk, potentially leading to improved patient outcomes. For example, if APs were formally introduced within the DMS, they will be empowered to have the authority that will grant them autonomy to make clinical decisions in the field—enabling independence in the delivery of time-critical interventions required in the operational PHEC environment.

The study has further emphasised the importance of offering clinical career opportunities for nurses and paramedics, underpinned by a well-defined AP strategy that delivers role definition. These opportunities have the potential not only to attract but also to retain nurses and paramedics within the DMS, thereby contributing to workforce resilience.

In summary, the study presents a compelling argument for DMS stakeholders to introduce APs into military PHEC. This introduction provides an investment in nurses and paramedics' careers but also delivers a workforce strategic advantage in the form of resilience and flexibility. This investment would strengthen PHEC capabilities for operational settings, which may lead to improved patient outcomes during military operations.

10.7 Conclusions

This is the first study of its kind which has investigated the role for the utility of a PHEC AP for UK military operations. The study has contributed to the DMS AP framework and strategy, RCEM mapping document and standardisation of titles to be used by Defence (appendix 12). In addition, operational roles such as within the RAF HSU and APhecP for Medevac operations are being formalised. The work has contributed to standardising existing APs career pathways. In addition, one military AP is currently on secondment to the HEE AP pathway for 3yrs to compare and contrast their training to existing AP in the DMS.

The findings suggest that introducing APs for PHEC will increase the capabilities for operations whilst promoting a greater partnership between the DMS workforce and HEE. The study has shown that nurses and paramedics are increasingly extending and expanding their scope of practice in the NHS, particularly in the Emergency and PHEC settings.

APs utilised in the OPCP will provide a force multiplier for Operations. With ongoing contingency operations, these roles provide a depth of knowledge and experience whilst creating greater flexibility, resilience, and improved patient safety for deployed teams. APs are autonomous in practice in these roles, which will undoubtedly prove a valuable and dynamic asset, capable of meeting future demands on operations whilst providing a clinical career pathway for nurses/paramedics wanting to develop their scope of practice.

Before the DMS can introduce AP, it will need to conduct a full review of its workforce to decide where and how to employ APs along the OPCP. The findings of this study, combined with the DLOD review, will need to ensure APs are trained, competent, and supported with a job plan and clinical-facing to meet the requirements for future operations. Before change can be implemented, culture and hierarchies need to be modernised and aligned with what is currently outlined in the Defence workforce's strategy and vision. This may help to mitigate previous challenges and experiences in the civilian sector, such as medical dominance, role identity, and preconceptions which resulted in the stagnation of AP development. Once APs have been introduced for PHEC deployments, the role should be supported with advances in technology, namely telemedicine, with access to a consultant for advice using Pando™ or Tempus pro™.

It is a clear finding within the study was that the introduction of APs for military PHEC at level 6 is supported by the DMS. With potential utility across OPCP APs, which would bridge the gap between PHEC levels 5-8 in patient care delivery during remote deployments. Aside from the operational effect, the role may inspire nurses and paramedics to seek or extend their military careers, which would be retention positive.

Following the implementation of APs for PHEC, research is required to demonstrate

efficacy within the workforce and further knowledge on the impact of AP.

Appendix 1 Databases searched via EBSCO Host Search Engine

ERIC, AMED - The Allied and Complementary Medicine Database, RILM Abstracts of Music Literature (1967 to present), PsycINFO, Teacher Reference Center, PsycARTICLES, Business Source Premier, EconLit, MEDLINE, SocINDEX with Full Text, American Bibliography of Slavic and East European Studies, CINAHL Plus with Full Text, Library, Information Science & Technology Abstracts, Computers & Applied Sciences Complete, RISM Series A/II: Music Manuscripts after 1600, GreenFILE, European Views of the Americas: 1493 to 1750, PsycBOOKS, Arts & Humanities Citation Index, Science Citation Index, Social Sciences Citation Index, ScienceDirect, MLA International Bibliography, Oxford Scholarship Online, Oxford Handbooks Online, arXiv, Informit Business Collection, Informit Engineering Collection, Informit Health Collection, Informit Humanities & Social Sciences Collection, eBook Collection (EBSCOhost), Art Abstracts (H.W. Wilson), Newswires, Informit Literature & Culture Collection, Informit Indigenous Collection, Oxford Bibliographies, Research Starters, Scopus®, SciELO, BioOne Complete, CogPrints, Naxos Music Library Jazz, Naxos Music Library, Naxos Spoken Word Library, Oxford Reference, Academic Search Index, Supplemental Index, Complementary Index, Grove Art Online, American National Biography Online, Grove Music Online, Directory of Open Access Journals, Public Information Online, eArticle, HeinOnline, OAPEN Library, British Library EThOS, 19th Century British Pamphlets, Henry Stewart Talks, Oxford Dictionary of National Biography, University Press Scholarship Online, British Standards Online, ACLS Humanities E-Book, Adam Matthew Digital, Rock's Backpages, ProjectMUSE, Cochrane Database of Systematic Reviews, MathSciNet via EBSCOhost, JSTOR Journals, Knovel, SciTech Connect, Sustainable Organization Library (SOL), NASA Technical Reports, FT.com, RePEc, Orlando: Women's Writing in the British Isles, from the Beginnings to the Present, Routledge Handbooks Online, IEEE Xplore Digital Library, Emerald Insight, Times Digital Archive, Open Textbook Library

Search strategies

Number of articles retrieved

Database	Total retrieved	Total included
Medline	435	54
CINAHL	186	44
EMBASE	503	51
PubMed	88	8

Total included from all databases	157
Total duplicates	53
Total included in the results	104

Limiters

English language
Publication year – 2004 – current

Other limiters

EMBASE – excluded Conference abstracts

Medline

Search ID#	Search Terms	Search Options	Results
S1	(MM "Advanced Practice Nursing")		1,648
S2	(MM "Nurse Practitioners")		13,401
S3	(MM "Emergency Medical Technicians")		4,375
S4	TI "Advanced practice" OR "Advanced practitioner*" OR Advanced W2 practitioner* OR "Emergency Care Practitioner* OR "Emergency Nurse Practitioner*" OR "Advanced Nurse Practitioner*" OR "Advanced Clinical Practitioner*" OR "Nurse practitioner*" OR Paramedic* OR "Emergency Medicine Technician*" OR EMT OR "Advanced Paramedic*" OR "Specialist Paramedic*" OR military W2 practitioner*		4,222
S5	AB "Advanced practice" OR "Advanced practitioner*" OR Advanced W2 practitioner* OR "Emergency Care Practitioner* OR "Emergency Nurse Practitioner*" OR "Advanced Nurse Practitioner*" OR "Advanced Clinical Practitioner*" OR "Nurse practitioner*" OR Paramedic* OR "Emergency Medicine Technician*" OR EMT OR "Advanced Paramedic*" OR "Specialist Paramedic*" OR military W2 practitioner*		6,857
S6	S1 OR S2 OR S3 OR S4 OR S5		24,485
S7	TI Deployed OR Deployment OR Tour* OR Combat OR Operation*		93,263
S8	AB Deployed OR Deployment OR Tour* OR Combat OR Operation*		603,672
S9	S7 OR S8		657,265

S10	TI military OR "armed forces" OR Navy OR naval OR Army OR Air Force OR Marines OR Reservist*		75,898
S11	AB military OR "armed forces" OR Navy OR naval OR Army OR Air Force OR Marines OR Reservist*		144,277
S12	S10 OR S11		176,189
S13	(MM "Emergency Medical Services")		33,411
S14	(MM "Air Ambulances")		2,451
S15	TI PHEM OR PHEC OR Pre-hospital OR Pre W1 hospital OR Pre-hospital OR "Emergency care" OR Medevac OR "Medical evacuation" OR "Aeromedical evacuation" OR Helicopter OR En W1 route care OR "En-route care" OR Enroute care OR Trauma* OR Casualty OR "Helicopter Emergency Medical Service" OR HEMS		689,876
S16	AB PHEM OR PHEC OR Pre-hospital OR Pre W1 hospital OR Prehospital OR "Emergency care" OR Medevac OR "Medical evacuation" OR "Aeromedical evacuation" OR Helicopter OR En W1 route care OR "En-route care" OR Enroute care OR Trauma* OR Casualty OR "Helicopter Emergency Medical Service" OR HEMS		689,907
S17	S13 OR S14 OR S15 OR S16		709,208
S18	S9 AND S12		16,913
S19	S6 AND S9		595
S20	S6 AND S12		239
S21	S6 AND S18		100
S22	S6 AND S17		2,751
S23	(MM "Military Medicine")		22,843
S24	S6 AND S23		76
S25	S4 AND S9		116
S26	S4 AND S17		230
S27	S20 OR S21 OR S24 OR S25 OR S26		552
S28	S20 OR S21 OR S24 OR S25 OR S26	Limiters - Scholarly (Peer Reviewed) Journals; Date of Publication: 20040101-20221231; English Language	435

CINAHL

Search ID#	Search Terms	Search Options	Results
S1	(MM "Emergency Nurse Practitioners")		528
S2	(MM "Advanced Practice Nurses")		3,728
S3	(MM "Advanced Nursing Practice")		7,949
S4	(MM "Nurse Practitioners")		11,930
S5	(MM "Emergency Medical Technicians")		7,961
S6	TI "Advanced practice" OR "Advanced practitioner*" OR Advanced W2 practitioner* OR "Emergency Care Practitioner* OR "Emergency Nurse Practitioner*" OR "Advanced Nurse Practitioner*" OR "Advanced Clinical Practitioner*" OR "Nurse practitioner*" OR Paramedic* OR "Emergency Medicine Technician*" OR EMT OR "Advanced Paramedic*" OR "Specialist Paramedic*" OR "Critical Care Paramedic*"		5,543
S7	AB "Advanced practice" OR "Advanced practitioner*" OR Advanced W2 practitioner* OR "Emergency Care Practitioner* OR "Emergency Nurse Practitioner*" OR "Advanced Nurse Practitioner*" OR "Advanced Clinical Practitioner*" OR "Nurse practitioner*" OR Paramedic* OR "Emergency Medicine Technician*" OR EMT OR "Advanced Paramedic*" OR "Specialist Paramedic*" OR "Critical Care Paramedic*"		6,859
S8	S1 OR S2 OR S3 OR S4 OR S5 OR S6 OR S7		35,435
S9	TI Deployed OR Deployment OR Tour* OR Combat OR Operation*		19,880
S10	AB Deployed OR Deployment OR Tour* OR Combat OR Operation*		97,858
S11	S9 OR S10		109,227
S12	TI military OR "armed forces" OR Navy OR naval OR Army OR Air Force OR Marines OR Reservist*		15,003
S13	AB military OR "armed forces" OR Navy OR naval OR Army OR Air Force OR Marines OR Reservist*		23,452
S14	S12 OR S13		29,761

S15	(MM "Prehospital Care")		10,855
S16	(MM "Emergency Care")		17,590
S17	(MM "Flight Nursing")		438
S18	(MM "Aircraft")		1,373
S19	(MM "Critical Care")		15,719
S20	(MM "Emergency Service")		34,051
S21	TI PHEM OR PHEC OR Pre-hospital OR Pre W1 hospital OR Prehospital OR "Emergency care" OR Medevac OR "Medical evacuation" OR "Aeromedical evacuation" OR Helicopter OR En W1 route care OR "En-route care" OR Enroute care OR Trauma* OR "Critical care" OR Casualty OR "Helicopter Emergency Medical Service" OR HEMS		87,057
S22	AB PHEM OR PHEC OR Pre-hospital OR Pre W1 hospital OR Prehospital OR "Emergency care" OR Medevac OR "Medical evacuation" OR "Aeromedical evacuation" OR Helicopter OR En W1 route care OR "En-route care" OR Enroute care OR Trauma* OR "Critical care" OR Casualty OR "Helicopter Emergency Medical Service" OR HEMS		136,711
S23	S15 OR S16 OR S17 OR S18 OR S19 OR S20 OR S21 OR S22		236,206
S24	S11 AND S14		6,773
S25	S8 AND S11		548
S26	S8 AND S14		175
S27	S8 AND S24		59
S28	S8 AND S23		4,299
S29	S8 AND S14 AND S23		52
S30	S6 AND S21		119
S31	S6 AND S9		14
S32	S26 OR S29 OR S30 OR S31		304
S33	S26 OR S29 OR S30 OR S31	Limiters - Published Date: 20040101-20221231; English Language; Peer Reviewed	186

EMBASE

-- 1   *emergency nurse practitioner/ (93) 2   *advanced practice provider/ (315) 3   *nurse practitioner/ (12538) 4   *rescue personnel/ (4203) 5   (Advanced practice or Advanced practitioner# or Emergency Care Practitioner# or Emergency Nurse Practitioner# or Advanced Nurse Practitioner# or Advanced Clinical Practitioner# or Nurse practitioner# or Paramedic# or Emergency Medicine Technician# or EMT or Advanced Paramedic# or Specialist Paramedic#).ti. (12591) 6   (Advanced adj2 practitioner#).ti. (233) 7   (military adj2

practitioner#).ti. (6) 8   5 or 6 or 7 (12640) 9   (Advanced practice or Advanced practitioner# or Emergency Care Practitioner# or Emergency Nurse Practitioner# or Advanced Nurse Practitioner# or Advanced Clinical Practitioner# or Nurse practitioner# or Paramedic# or Emergency Medicine Technician# or EMT or Advanced Paramedic# or Specialist Paramedic#).ab. (61712) 10   (Advanced adj2 practitioner#).ab. (943) 11   (military adj2 practitioner#).ab. (42) 12   1 or 2 or 3 or 4 or 8 or 9 or 10 or 11 (76909) 13   (Deployed or Deployment or Tour# or Combat or Operation#).ti. (35852) 14   (Deployed or Deployment or Tour# or Combat or Operation#).ab. (269088) 15   13 or 14 (287850) 16   (military or armed forces or Navy or naval or Army or Air Force or Marines or Reservist#).ti. (30282) 17   (military or armed forces or Navy or naval or Army or Air Force or Marines or Reservist#).ab. (70095) 18   16 or 17 (81268) 19   *emergency care/ (16450) 20   *air medical transport/ (1951) 21   *helicopter/ (1158) 22   (PHEM or PHEC or Pre-hospital or Prehospital or Emergency care or Medevac or Medical evacuation or Aeromedical evacuation or Helicopter or En-route care or Enroute care or Trauma# or Casualty or Helicopter Emergency Medical Service or HEMS).ti. (20929) 23   (Pre adj1 hospital).ti. (2889) 24   (En adj1 route care).ti. (34) 25   22 or 23 or 24 (20954) 26   (PHEM or PHEC or Pre-hospital or Prehospital or Emergency care or Medevac or Medical evacuation or Aeromedical evacuation or Helicopter or En-route care or Enroute care or Trauma# or Casualty or Helicopter Emergency Medical Service or HEMS).ab. (51721) 27   (Pre adj1 hospital).ab. (8419) 28   (En adj1 route care).ab. (70) 29   19 or 20 or 21 or 25 or 26 or 27 or 28 (73092) 30   15 and 18 (13330) 31   12 and 15 (851) 32   12 and 18 (365) 33   12 and 29 (3677) 34   12 and 30 (107) 35   12 and 18 and 29 (78) 36   8 and 18 (34) 37   8 and 15 (139) 38   8 and 29 (542) 39   34 or 35 or 36 or 37 or 38 (817) 40   limit 39 to (english language and yr="2004 -Current") (670) 41   limit 40 to conference abstracts (167) 42   40 not 41 (503) 43   from 42 keep (51)

PubMed similar articles search
Using the article - Is there a role for an advanced practitioner in UK military pre-hospital care?

Appendix 2

Sir, Ma'am, Colleagues

What are the requirements for level 6 pre-hospital emergency care?

You are being invited to participate in a Delphi survey to explore and identify the clinical and non-technical skills required for Defence Pre-Hospital Emergency Care (PHEC) level 6.
Defence PHEC levels have been agreed and endorsed by Defence Medical Services and provide a framework to group the different skill levels providing military PHEM and are based on the NHS Skills for Health. Currently levels 7-8 are supported by specialist PHEM training, and their scope of practice is defined by national subspecialty curriculum. Levels 5-6 are less well defined in terms of delivery of clinical practice and non-technical skills.

The Delphi technique, developed by the Rand Corporation, involves anonymised contributions from a panel of experts, with the objective of progressively developing a consensus agreement between panel members.
The Delphi approach can have many iterations to find agreement; however, on average three rounds is normally sufficient (Hsu and Sandford, 2007, Chang et al., 2010). Round 1, will consist of emailed questions to gain information from you on each of the competencies for each level. Round 2, will comprise of focused statements specifically for level 6 practice, where you will be asked to rank these in order of importance and relevance. The last round will be further questions to clarify any items that have not been agreed on, again this will be conducted via an online questionnaire.

You have been chosen as a PHEM SME to gather your opinion on the associated skills required for each of the Defence PHEC levels. Your views will help to form a collective agreement on what each of the PHEC levels should be delivering and provide a consensus on scopes
of agreed practice. Your participation is entirely voluntary and if you choose not to participate you will not be disadvantaged in any way.
The study will be questionnaire based, remain anonymous and should not take any longer than 60 minutes in total to complete.

Over the next 1-3 months further emails will be sent to explain the later stages of the survey in detail.
The Delphi approach aims to achieve consensus and agreement on the requirements of PHEC level 6 practice.
An email will follow with a link to the survey, I appreciate it's a long questionnaire, however, it's hoped the data will be used for the development of skill sets in Defence PHEC.

Kind Regards

Sqn Ldr Paxman
ACP
Emergency Medicine
07875514580

Appendix 3 Delphi Round 1 email

What are the requirements for level 6 pre-hospital emergency care?

You are being invited to participate in a Delphi survey to explore and identify the clinical and non-technical skills required for Defence Pre-Hospital Emergency Care (PHEC) level 6. Defence PHEC levels have been agreed and endorsed by Defence Medical Services and provide a framework to group the different skill levels providing military PHEC and are based on the NHS Skills for Health. From these levels 7-8 are supported by specialist PHEM training and their scope of practice is defined by national subspecialty curriculum. Levels 5-6 are less well defined in terms of delivery of clinical practice and non-technical skills.

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members. The Delphi approach can have many iterations to find agreement; however, on average three rounds is normally sufficient (Hsu and Sandford, 2007, Chang et al., 2010). Round 1 will consist of emailed questions to gain information from you on each of the competencies for each level. Round 2 will comprise of focused statements specifically for level 6 practice, where you will be asked to rank these in order of importance and relevance. The last round will be further questions to clarify any items that have not been agreed on, again this will be conducted via an online questionnaire.

You have been chosen as a PHEM SME to gather your opinion on the associated skills required for each of the Defence PHEC levels. Your views will help to form a collective agreement on what each of the PHEC levels should be delivering and provide a consensus on scopes of agreed practice. Your participation is entirely voluntary and if you choose not to participate you will not be disadvantaged in any way. The study will be questionnaire based, remain anonymous and should not take any longer than 60 minutes in total to complete. Over the next 1-3 months further emails will be sent to explain the later stages of the survey
in detail.

The Delphi approach aims to achieve consensus and agreement on the requirements of PHEC level 6 practice. If you are willing to take part please click the link to commence stage1 of the study. Please mark if the competencies fit across levels 5-8 or specific levels, these competencies have been taken from the Faculty of Pre-Hospital Care (FPHC, 2017). For generic competencies please tick "All levels 5-8". If specific to a particular level(s) please tick all that apply

For example: Recognition of life-threatening haemorrhage? Is this more generic and therefore fits with all of the levels 5-8 or is it specific to certain levels 6,7,

Appendix 3 Delphi Round 1 Questions

Section 1. Stage 1 What are the requirements for level 6 pre-hospital emergency care?

Please mark if the competencies fit across levels 5-8 or specific levels, these competencies have been taken from the Faculty of Pre-Hospital Care (FPHC, 2017).

For generic competencies please tick "All levels 5-8". If specific to a particular level(s) please tick all that apply

For example:

Recognition of life-threatening haemorrhage? Is this more generic and therefore fits with all of the levels 5-8 or is it specific to certain levels 6,7,8?

Question 1.1

Stage 1
What are the requirements for level 6 pre-hospital emergency medicine?
Please mark what levels you think these competencies fit, these competencies have been taken from the Faculty of Pre-Hospital Care(FPHC, 2017)

Skills	All levels 5-8	L5	L6	L7	L8
Safety					
Wear correct PPE for incident					
Demonstrate understanding of scene safety					
Perform dynamic risk assessment of scene					
Consider casualty safety					
Perform dynamic risk assessment of casualties					
Communicate effectively with Emergency Services					
Scene Management					
Basic knowledge of the capabilities of different Emergency Services Personnel Ability to use appropriate radio communications					
Awareness of triage					
Competence in triage sieve					
Competence in triage sort & management skills for multiple casualties					
Ability to make decisions on casualty dispersement					
Ability to incident command					
Demonstrate forensic awareness					
Catastrophic Bleed					
Recognise life-threatening haemorrhage					
Effectively manage catastrophic limb bleed					
Effectively manage catastrophic junctional bleed					

Able to apply indirect pressure					
Competent application of tourniquet					
Competent in use of haemostatic / packing					
Spinal					
Appreciate MOI high risk for spinal injury					
Appropriate C-spine management					
Airway					
Put head in neutral alignment					
Inspect and clear airway					
Head tilt chin lift + neutral alignment					
Jaw thrust					
Postural airway management					
Use of suction					
Size and insert nasopharyngeal airway					
Size and Insert oropharyngeal airway					
Size and insert supraglottic airway device					
Perform surgical airway					
Perform needle cricothyroidotomy in children					
Competent to RSI assistant					
Endotracheal tube insertion					
Breathing					
Identify if patient is breathing normally					
Correctly assess breathing rate					
depth and quality Perform basic chest examination Rise and Fall					
Identify life-threatening chest conditions					

Finger thoracostomy					
Needle decompression					
Chest drain insertion					
Management of sucking chest wound					
Recognition of a sucking chest wound					
Application & management of occlusive chest dressings					
Recognition of immediately life-threatening flail chest					
Competent management of massive haemothorax					
Understanding of enviro limitations of pulse oximetry					
use if appropriate Ability to monitor & react to end tidal CO2					
Safely configure an Oxygen system for use Free-flow oxygen (+ correct mask choice)					
Nebulisation					
Nebulisation with T-piece					
Oxygen delivery via Bag-valve-mask					
Oxygen delivery via mechanical ventilator					
Circulation					
Assess presence of circulation Measure pulse rate and rhythm					
Assess blood pressure					
Measure capillary refill time					
Assessment of heart sounds					
Use of pre-hospital imaging techniques Assessment of blood loss					
Apply direct pressure					
Apply indirect pressure					
Wound packing					

Wound closure					
Splintage as a haemorrhage control					
method Use of haemostatic agents					
Use of appropriate medication for haemorrhage control					
Application of pelvic splintage					
Use of traction devices					
Attain intravascular access (IV/IO)					
Administration of appropriate IV fluids					
Ability to administer blood products					
Application of appropriate wound dressings					
Ability to perform a twelve lead ECG					
Ability to interpret a twelve lead ECG					
Disability					
Assess AVPU					
Use Glasgow Coma Score					
Assess PERL					
Identify indicators of underlying head injury					
Assessment of traumatic brain injury					
Assess Blood Glucose level with a glucometer					
Assess neurovascular status					
Perform a more indepth neurological examination					
Perform a FASTest (acute stroke)					
Exposure					
Differentiate Cold from Hypothermia					
Differentiate heat exhaustion from Heat stroke					

Recognise possibility of and prevent hypothermia					
Recognise possibility of and prevent hyperthermia					
Assessment, treatment and casualty handling of patients exposed to extremes of temperature in an austere environment.					
Casualty Handling					
Appropriate packaging of patient for evacuation					
Assist with transfer of patient					
Manage transfer of patient to appropriate evacuation device					
Ability to medically assist in safe extrication of a patient in an operational environment					
Ability to medically manage the safe extrication of a patient in an operational environment					
Ability to understand and make disposition decision					
Provide appropriate clinical handover to next echelon of care					
Obstetrics					
Ability to carry out cABCDE appropriately in a pregnant woman					
Manage the complications of pregnancy					
Management of pregnancy-related bleeding					
Manage the common complications of delivery					
Manage a normal delivery					
Emergency Caesarean Section					
Aware of the complications of rescue packaging and transport					
Paediatrics					
Ability to carry-out Basic Life Support protocols on a child and infant					

Ability to provide basic resuscitation to a neonate					
Knowledge of normal anatomy & physiology of a child					
Manage common childhood emergencies					
Refer and manage safeguarding issue					
Knowledge of the differences in triage parameters for children of different ages					
Mental Health					
Awareness of simple consent issues					
Awareness of simple mental health issues					
Be able to perform a competency assessment					
Be able to understand and apply the current Mental Health Act					
Be able to understand and apply the current Mental Capacity Act					
Ability to perform a mental capacity assessment					
Ability to administer appropriate medication as necessary					
Understand the law and make decisions regarding section 136 (or equivalent) and 'Place of Safety'					
Thermal Injury					
Ability to assess the extent and severity of thermal injury					
Recognise when specialist input is needed					
Recognise public health risks of chemical agents and carry out appropriate actions					
Understand and apply the HAZMAT code					
Apply appropriate treatment and burns dressings					
Competence in managing the severe complications of burns (i.e. escharotomy)					

Musculoskeletal injuries					
Ability to perform basic joint examinations					
Recognition of likely fracture					
Identification of dislocation					
Reduction of dislocations where appropriate					
Reduction of fractures where appropriate					
Use of appropriate analgesia					
Recognition & appropriate initial treatment of soft tissue injury					
Drowning					
Recognition and management of unconscious drowned patient					
Recognition and management of conscious drowned patient					
Recognition of late complications of drowning					
Death					
Identification of life extinct in exceptional circumstances					
Trauma Interventions and ultrasound					
Rapid Sequence Induction (RSI)					
Thoracotomy					
eFAST (Extended Focused Assessment with Sonography for Trauma)					
Administration inotropes					
Administration of paralysis post cardiac arrest in ROSC					
Procedural sedation using ketamine					
Medical (Ability to definitively treat, discharge and manage)					
Airway obstruction / choking / stridor					
Acute breathlessness					
Cardiac arrest					

peri-arrest Hypotension and shock					
Palpitation and cardiac arrhythmia					
Acute headache					
Acute abdominal / loin / scrotal pain					
Acute vomiting					
Acute confusional state					
Collapse					
The unconscious patient					
Intoxication and poisoning					
The fitting patient					
Acute allergic reaction					
Acute non-traumatic neck / back pain x Sudden weakness / paralysis / abnormal sensation					
Acute visual disturbance / red eye					
Acute febrile illness					
Acute gastrointestinal haemorrhage					
Acute limb pain and/or swelling					
Acute rash					
Acute haemoptysis					
Bites, strings and envenomation					
Clinical recognition and management of diabetic hypoglycemia					
Recognition and management of diabetic hyperglycaemia					
Acute epistaxis					
Recognition and immediate management of Stroke/TIA					
Headache management					

Recognition of main causes of chest pain					
Management/ referral for main causes of chest pain - Myocardial Infarction					
Myocardial Infarction drug management, including analgesia					
Direct referral to PCI for STEMI patients					
12 lead ECG completion/interpretation					
Recognition of non-traumatic limb swelling					
Recognition of Allergy/Anaphylaxis/Bites and stings IM adrenaline for Anaphylaxis					
Recognition of common Toxicity and Poisoning Management for common toxins/poison					
Recognition of Meningitis in adults and children					
Management of Meningitis in adults and children IV/IM/IO Antibiotics for Meningitis					
Recognition/Management of Sepsis					
Recognition/management of hypothermia					
Recognition/management of exposure/cold injuries					
Recognition/management of heat exhaustion					
Recognition/management of heat illness					
Cardiac pacing					
Use and administration of CPAP ventilation					
Communication					
Clinical leadership					
Operational leadership					
Lead debrief					
Team Working					
Coordinating activities with the team					
Exchanging information					
Using authority and assertiveness					

Task Management					
Planning and preparing					
Prioritising					
Providing and maintaining standards					
Situational awareness					
Gathering information					
Recognising and understanding					
Anticipating					
Decision making					
Identifying options					
Balancing risks and selecting options					
Re-evaluating					

Appendix 4 Delphi Round 2 Questions

Round 2 What are the requirements for level 6 pre-hospital emergency care?

Section 1. Round 2

Welcome to the second round, this will be shorter and focused on obtaining consensus of opinion on PHEM level 6 competency. Based on the technical and non-technical skills using a 5-point Likert scale (5 = Strongly agree; 4=Agree; 3=Undecided, 2=Disagree, 1=Strongly Disagree), you will be asked if you consider the competency compliant with PHEM level 6.

The study is important and supported by MoD, your participation is voluntary and the information you provide remains 100% confidential.
The Delphi approach aims to achieve consensus and agreement on the requirements of PHEC level 6 practice. An email will follow with a link to round 2 of the survey after 1 Apr 19.

Question	strongly agree	Agree	Undecided	Disagree	Strongly disagree
Competence in triage sort & management skills for multiple casualties					
Ability to make decisions on casualty dispersement					
Ability to incident command					
Procedural sedation using ketamine					
Perform surgical airway					
Perform needle cricothyroidotomy in children					
Competent to RSI (Rapid Sequence Induction) assist					
Endotracheal tube insertion					
Finger thoracostomy					
Management of massive haemothorax					
Ability to monitor & react to end tidal CO_2					

Nebulisation with T-piece					
Oxygen delivery via mechanical ventilator					302
Assessment of heart sounds					
Wound closure enhanced (suturing, glue, staples)					
Administration of appropriate IV fluids					
Ability to administer blood products					
Ability to interpret key rhythms on a twelve lead ECG					
Perform an in depth neurological examination					
Manage the complications of pregnancy					
Manage the common complications of delivery					
Emergency Caesarean Section					
Manage common childhood emergencies					
Be able to understand and apply the current Mental Health Act					
Understand the law and make decisions regarding section 136 (or equivalent) and 'Place of Safety'					
Competence in managing the severe complications of burns (i.e. escharotomy)					
Reduction of dislocations where appropriate					
Reduction of fractures where appropriate					
Identification of life extinct in exceptional circumstances					
eFAST (Extended Focused Assessment with Sonography for Trauma)					
Administration of inotropes					
Administration of paralysis post cardiac arrest in ROSC (return of spontaneous circulation) Airway obstruction / choking / stridor					
Cardiac arrest					
Acute visual disturbance / red eye					
Acute febrile illness					
Acute haemoptysis					

Recognition of non-traumatic limb swelling					
Recognition/management of Sepsis					
Cardiac pacing					
Use and administration of CPAP (continuous positive airway pressure) ventilation					
Clinical leadership					
Lead debrief					
Airway obstruction / choking / stridor					
Ability to administer appropriate medication as necessary					
Use of pre-hospital imaging techniques					
Chest drain insertion					
Ability to incident command in the absence of a trained commander					
OC MERT role					

Appendix 5 Delphi Round 3 Questions

Round 3 What are the requirements for level 6 pre-hospital emergency care?

Sir, Ma'am, Colleagues

Round 3; What are the requirements for level 6 pre-hospital emergency care?

Many thanks to those who have completed rounds 1 and 2, the 3rd round consists of 6 items that have not been agreed on and follows the same format as round 2. Based on the technical and non-technical skills using a 3-point Likert scale (1=Agree; 2=Undecided, 3 =Disagree), you will be asked if you consider
the competency a requirement of PHEC level 6 care.

This round will close on the 15th Jul, after which the last round will be sent with the agreed consensus items for you to review and provide any feedback.

Thank you again the study is important and supported by MoD, your participation is voluntary and the information you provide remains 100% confidential.

Section 1. Round 3

Question	Agree	Undecided	Disagree
Ability to incident command in the absence of a trained commander			
Able to perform the skill of needle cricothyroidotomy in children			
Able to perform the skill of a chest drain insertion			
Can perform pre-hospital ultrasound scanning; eFAST (Extended Focused Assessment with Sonography for Trauma) and echocardiography.			
Is competent in managing severe complications of burns in the pre-hospital phase. for example perform an escharotomy			
Is able to perform the role of OC MERT			

Question 1.7

Please use this box for comments if you are undecided or do not agree that these items are level 6 competencies

Appendix 6 Delphi Round 4 Questions

Round 4 What are the requirements for level 6 pre-hospital emergency care?

Many thanks to those who have completed round 3.

The last round will include a list of items that have been agreed as requirements for PHEC level 6. This list may include some items that you feel are level 5, however, PHEC, level 6 providers should be competent in level 5 competencies therefore, please do not worry about differentiating between level 5 and 6 requirements.

Please could I ask you to review the list of competencies and tick if you agree or disagree that these are a requirement of PHEC level 6 **only.** Also outlined are items that were agreed as level 7-8 and items that did not reach consensus. If you are not sure or do not agree, please use the comments box to outline further.

The study is important and supported by MoD, your participation is voluntary and the information you provide remains 100% confidential.

The Delphi approach aims to achieve consensus and agreement on the requirements of PHEM level 6 practice. An email will follow with a link to round 4 of the survey and will close on the **15 Aug**.

Section 1. Round 4

Please review the following items and tick if you agree or disagree to these level 6 competencies. If you are not sure or do not agree please use the comments box to outline further.

Question 1.1

Agreed PHEC level 6 requirements

Competence in triage sort & management skills for multiple

casualties Ability to make decisions on casualty dispersement

Ability to incident command

Procedural sedation using

ketamine Perform surgical airway

Perform needle cricothyroidotomy in

children Competent to assist with PHEA

Endotracheal tube insertion

Finger thoracostomy

Management of massive haemothorax

Ability to monitor & react to end tidal CO2

Nebulisation with T-piece

Oxygen delivery via mechanical

ventilator Assessment of heart sounds

Use of pre-hospital imaging techniques

Wound closure enhanced (suturing, glue,

staples) Ability to administer blood products

Ability to interpret key rhythms on a twelve lead

ECG Perform an in depth neurological examination

Manage the complications of pregnancy

Manage the common complications of

delivery Manage common childhood

emergencies

Be able to understand and apply the current Mental Health

Act Ability to administer appropriate medication as

necessary

Understand the law and make decisions regarding section 136 (or equivalent) and 'Place of

Safety' Reduction of dislocations where appropriate

Reduction of fractures where appropriate

Identification of life extinct in exceptional circumstances

eFAST (Extended Focused Assessment with Sonography for

Trauma) Administration of inotropes

Administration of paralysis post cardiac arrest in ROSC (return of spontaneous

circulation) Management of airway obstruction / choking / stridor

Management of cardiac arrest

Management of palpitations and cardiac

arrhythmias Management of an acute confusional

state Management of acute visual disturbance /

red eye

Management of acute febrile

illness Management of acute

haemoptysis

Management of non-traumatic limb swelling

Management of cardiac pacing

Use and administration of CPAP (continuous positive airway pressure) ventilation

Provide clinical leadership

Lead a debrief

Perform the OC MERT role

○ Agree

○ Disagree Question
1.2

If you are not sure or do not agree with the list of PHEM level 6 requirements, please use the comments box to outline further?

Question 1.3

  Level 7-8 only

Perform Pre-Hospital Emergency Anesthesia

(PHEA) Perform a Thoracotomy

Perform a Perimortem section

Question 1.4

If you are not sure or do not agree with the list of PHEM 7-8 requirements, please use the comments box to outline further?

Question 1.5

  Items not reached consensus

Able to perform the skill of a chest drain insertion

Competent in managing severe complications of burns in the pre-hospital phase, for example can perform an escharotomy

Question 1.6

If you are not sure or do not agree with the list of items that did not reach consensus, please use the comments box to outline further?

Thank you for taking this questionnaire.

Appendix 7 Semi-Structured Interview Questions

Semi- Structured Interview Questions

Non-AP participants from the multi-disciplinary team: These respondents are subject matter experts in PHEC working in the multi-disciplinary team (levels 5 – 8)

What is your understanding of a Advanced Practice roles, military and civilian

Do you feel the AP role has any benefits to patient care?

What do you think supports or inhibits the AP role?

Do you think APs should be deployed in military pre-hospital care? If so, in what capacity?

What is the utility of a Military Level 6 practitioner?

Could an AP operate at PHEM level 6? What would be the barriers, what additional training do you think APs should have?

Additional questions following Delphi Study (For Delphi participants only) participants only)

What skills should a level 6 practitioner have to be able to manage a chest injury over 24-48 hours?

In regards to perimortem c-section should level 6 be qualified in this, what are your thoughts re the likelihood?

What level of advanced airway skills does PHEM level 6 need, should they be trained to intubate?

Should level 6 practitioners be trained in ultrasound? What areas should it cover and why?

What role should be recognised as level 6 ? (Nurse, GP and paramedic)

AP Interview Question Schedule:
Introduction: Please describe your experience of Advanced Practice in firm base including relevant military deployments?

In terms of your AP training, what did that include, how was this translated into practice?

What is your primary role when not deployed?

During your previous pre-hospital deployments did you find there were any aspects of your AP qualifications and experience that could have enhanced patient care delivery?

What was your experience of working within the deployed team as an AP?

What do you feel supports or inhibits the role, both in peacetime and deployments?

Do you think APs should be deployed in a pre-hospital environment? If so, in what capacity?

What additional training do you feel is required if you were to be deployed operationally in a pre-hospital setting?

Are there other aspects of the role you feel should now be the focus for development, such as deployment opportunities, career pathways etc?

Is there a place for Level 6 practice in military pre-hospital care?

Appendix 8 Consent form & PI form

Participant Information Sheet For AP

Study Title 'The Utility of a Military Advanced Practitioner (AP) within the Pre-Hospital Care Environment'.

MoDREC Application No: 887/MoDREC/18

Invitation to take part in AP interviews

You are invited to participate in this research project. You should only take part if you want to; if you choose not to participate you will not be disadvantaged in any way.

What is the Purpose of the Research?

This PhD research aims to explore and consider if there is an operational role for an Advanced Practitioner (AP) in a military pre-hospital environment.

This research aims to:

1. Understand the experiences of current military APs from previous pre-hospital deployments.
2. Explore the current experiences and perceptions from the pre-hospital multi-disciplinary team (doctors, nurses and paramedics) on the military AP role.
3. Validate the Defence Pre-Hospital Emergency Medicine Level 6 requirements.

Who is Doing This Research?

Sqn Ldr Liz Paxman
Advanced Clinical Practitioner
Elizabeth.Paxman@ouh.nhs.uk
+447875514580
Room 3503, Level 3 JR2
The John Radcliffe Hospital, Headley Way
Headington, Oxford, OX39DU

Why Have I Been Invited to Take Part?

You have been chosen to participate in the study because you are qualified as a military Advance Pre-Hospital Practitioner.

Do I Have to Take Part?

No, participation is voluntary. Taking part in the study will bring neither a career advantage or disadvantage.

What Will I Be Asked to Do?

Your role as an AP will be explored via semi-structured interviews. These interviews will focus on your experiences of AP training and current clinical practice both deployed and in the firm base. Your opinions will be sought on the future of the role in Defence. All

interviews will be audibly recorded and transcribed. The interviews will generate qualitative data used for the study.

What are the Benefits of Taking Part?

Whilst there are no immediate benefits for your participation, it is hoped this study will produce valuable evidence to illustrate current experiences of APs.

What are the Possible Disadvantages and Risks of Taking Part?

It is not anticipated that any disadvantages or risks will present.
In the event of you suffering any adverse effects as a consequence of your participation in this study, you will be eligible to apply for compensation under the MoD's 'No Fault Compensation Scheme' (see separate sheets for details).

Can I Withdraw from the Research and What Will Happen If I Withdraw?

Your participation is voluntary and as such can withdraw at any time, without giving a reason. The process for withdrawal from the study can be done by contacting the primary researcher to request a withdrawal by telephoning +447875514580 or emailing Elizabeth.paxman@ouh.nhs.uk and quoting the code number at the top of this form.
As a result, all data will be permanently erased and this can be witnessed if required.

Are There Any Expenses and Payments Which I Will Get?

You will not be expected to experience any costs as the interviews will either be completed in work time at a place of your choosing. Therefore, there are no other expenses or payments available to participants.

Will My Taking Part or Not Taking Part Affect My Service Career?

Choosing to take part or not will not affect your Service career in any way.

Whom Do I Contact If I Have Any Questions?

Sqn Ldr Liz Paxman
Advanced Clinical Practitioner
Elizabeth.Paxman@ouh.nhs.uk
+447875514580
Room 3503, Level 3 JR2
The John Radcliffe Hospital, Headley Way
Headington, Oxford, OX39DU

Whom Do I Contact If I Have a Complaint?

Dr Amarjit Samra
Director of Research,
Royal Centre for Defence Medicine
Birmingham Research Park
Vincent Drive
Edgbaston
Birmingham
B15 2SQ

What Happens If I Suffer Any Harm?

If you suffer any harm as a direct result of taking part in this study, you can apply for compensation under the MoD's 'No-Fault Compensation Scheme, a copy of the form is attached.

Will My Records Be Kept Confidential?

Any information obtained during this study will remain confidential as to your identity; if it can be specifically identified with you, your permission will be sought in writing before being published. Other material, which cannot be identified with you, will be published or presented at meetings with the aim of benefiting others. You have a right to obtain copies of all papers, reports, transcripts, summaries and other material so published or presented on request made to the primary investigator. All information will be subject to the current conditions of the Data Protection Act 1998 and GDPR 2018. You have the right of access to your records at any time.

Storage and management of data will be in accordance with the University Southampton Policy (2016) and MoD policy pertaining to the storage of personal information, all data pertaining (with exception of film footage, which will be deleted after viewing) to the study will be retained for 10yrs. The data will be stored in an encrypted file which is backed up on the university server network, this is in accordance with article 89 (GDPR 2018).

Who is Organising and Funding the Research?

The research is being organised jointly through Southampton University and the Academic Department of Military Nursing. The PhD research has been funded as part of a Thames Valley Health Education England Fellowship.

Who Has Reviewed the Study?

This study has been reviewed and given favourable opinion by the Ministry of Defence Research Ethics Committee (MoDREC).

Further Information and Contact Details

Please contact the primary investigator Sqn Ldr Paxman

Compliance with the Declaration of Helsinki

This study complies, and at all times will comply, with the Declaration of Helsinki [1] as adopted at the 64th WMA General Assembly at Fortaleza, Brazil in October 2013.

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[1] World Medical Association Declaration of Helsinki [revised October 2013]. Recommendations Guiding Medical doctors in Biomedical Research Involving Human Subjects. 64th WMA General Assembly, Fortaleza (Brazil).

Consent Form: AP Participants

Title of Study: The Utility of a Military Advanced Practitioner (AP) within the Pre-Hospital Care Environment

MoDREC Reference : 887/MODREC/18

Please Initial or Tick Boxes

- **The nature, aims and risks of the research have been explained to me. I have read and understood the Information for Participants and understand what is expected of me. All my questions have been answered fully to my satisfaction.**

☐

- **I understand that if I decide at any time during the research that I no longer wish to participate in this project, I can notify the researchers involved and be withdrawn from it immediately without having to give a reason. I also understand that I may be withdrawn from it at any time, and that in neither case will this be held against me in subsequent dealings with the Ministry of Defence.**

☐

- **I consent to the processing of my personal information for the purposes of this research study. I understand that such information will be treated as strictly confidential and handled in accordance with the provisions of the Data Protection Act 1998 and GDPR 2018.**

☐

- **This consent is specific to the particular study described in the Information for Participants attached and shall not be taken to imply my consent to participate in any subsequent study or deviation from that detailed here.**

☐

- **I understand that in the event of my sustaining injury, illness or death as a direct result of participating as a volunteer in Ministry of Defence research, I or my dependants may enter a claim with the Ministry of Defence for compensation under the provisions of the no-fault compensation scheme, details of which are attached.**

☐

- **I understand that my interviews will be audio recorded.**

☐

Participant's Statement :

I ....

agree that the research project named above has been explained to me to my satisfaction and I agree to take part in the study. I have read both the notes written above and the Information for Participants about the project, and understand what the research study involves.

Signed :   **Date :**

Witness   Name :

Signature :

Date :

Investigator's Statement :

I ....

confirm that I have carefully explained the nature, demands and any foreseeable risks (where applicable) of the proposed research to the Participant.

Signed :   Date :

Authorising Signatures

The information supplied above is to the best of my knowledge and belief accurate. I clearly understand my obligations and the rights of research participants, particularly concerning recruitment of participants and obtaining valid consent.

Signature of Chief Investigator

……………………………………………   **Date :**

Name and Contact Details of Independent Medical Officer (*if appropriate*) :

Name and Contact Details of Chief Investigator :

Interviews Participant Information Sheet

Study Title The Utility of a Military Advanced Practitioner (AP) within the Pre-Hospital Care Environment

MoDREC Application No: 887/MoDREC/18

Invitation to Take Part in Interviews

You are invited to participate in this research project. You should only take part if you want to; if you choose not to participate you will not be disadvantaged in any way.

What is the Purpose of the Research?

This PhD research aims to explore and consider if there is an operational role for an Advanced Practitioner (AP) in a military pre-hospital environment.

This research aims;
1. Understand the experiences of current military APs from previous pre-hospital deployments.
2. Explore the current experiences and perceptions from the pre-hospital multi-disciplinary team (doctors, nurses and paramedics) on the military AP role.
3. Validate the Defence Pre-Hospital Emergency Medicine Level 6 requirements.

Who is Doing This Research?

Sqn Ldr Liz Paxman
Advanced Clinical Practitioner
Elizabeth.Paxman@ouh.nhs.uk
+447875514580
Room 3503, Level 3 JR2
The John Radcliffe Hospital, Headley Way
Headington, Oxford, OX39DU

Why Have I Been Invited to Take Part?

You have been chosen to participate in the study because you have been working with Advanced Practitioners (AP) who are either military or civilian in pre-hospital care, this includes critical care paramedics, advanced clinical practitioners or advanced paramedic practitioners.

Do I Have to Take Part?

No, participation is voluntary. Taking part in the study will bring neither a career advantage or disadvantage.

What Will I Be Asked to Do?

The interviews will explore your experiences of working with this role using a semi-structured format. The interviews will generate qualitative data used for the study. Your opinions will be sought on the future of the role in Defence. All interviews will be audibly recorded and transcribed.

What are the Benefits of Taking Part?

Whilst there are no immediate benefits for your participation, it is hoped this study will produce valuable evidence to illustrate current experiences of APs working in the pre-hospital environment.

What are the Possible Disadvantages and Risks of Taking Part?

It is not anticipated that any disadvantages or risks will present. However, in the event of you suffering any adverse effects as a consequence of your participation in this study, you will be eligible to apply for compensation under the MoD's 'No Fault Compensation Scheme' (see separate sheets for details).

Can I Withdraw from the Research and What Will Happen If I Withdraw?

Your participation is voluntary and as such can withdraw at any time, without giving a reason. The process for withdrawal from the study can be done by contacting the primary researcher to request a withdrawal by telephoning +447875514580 or emailing Elizabeth.paxman@ouh.nhs.uk and quoting the code number at the top of this form. As a result, all data will be permanently erased and this can be witnessed if required.

Are There Any Expenses and Payments Which I Will Get?

You will not be expected to require any expenses as the interviews will either be completed in work time at a place of your choosing. There are no other expenses or payments available to participants.

Will My Taking Part or Not Taking Part Affect My Service Career?

Whether you choose to take part or not will not affect your Service career in any way.

Whom Do I Contact If I Have Any Questions?

Sqn Ldr Liz Paxman
Advanced Clinical Practitioner
Elizabeth.Paxman@ouh.nhs.uk
+447875514580
Room 3503, Level 3 JR2
The John Radcliffe Hospital, Headley Way
Headington, Oxford, OX39DU

Whom Do I Contact If I Have a Complaint?

Dr Amarjit Samra
Director of Research,
Royal Centre for Defence Medicine
Birmingham Research Park
Vincent Drive
Edgbaston
Birmingham
B15 2SQ

What Happens If I Suffer Any Harm?

If you suffer any harm as a direct result of taking part in this study, you can apply for compensation under the MoD's 'No-Fault Compensation Scheme. A copy of the form is attached.

Will My Records Be Kept Confidential?

Any information obtained during this study will remain confidential as to your identity; if it can be specifically identified with you, your permission will be sought in writing before being published. Other material, which cannot be identified with you, will be published or presented at meetings with the aim of benefiting others. You have a right to obtain copies of all papers, reports, transcripts, summaries and other material so published or presented on request to the main investigator. All information will be subject to the current conditions of the Data Protection Act 1998 and GDPR 2018. You have the right to access your records at any time.

Storage and management of data will be in accordance with the University Southampton Policy (2016) and MoD policy pertaining to the storage of personal information, all data pertaining (with exception of film footage, which will be deleted after viewing) to the study will be retained for 10yrs. The data will be stored in an encrypted file which is backed up on the university server network, this is in accordance with article 89 (GDPR 2018).

Who is Organising and Funding the Research?

The research is being organised jointly through Southampton University and the Academic Department of Military Nursing. The PhD research has been funded as part of a Thames Valley Health Education England fellowship.

Who Has Reviewed the Study?

This study has been reviewed and given favourable opinion by the Ministry of Defence Research Ethics Committee (MoDREC).

Further Information and Contact Details

Please contact the primary investigator Sqn Ldr Paxman

Compliance with the Declaration of Helsinki

This study complies, and at all times will comply, with the Declaration of Helsinki [2] as adopted at the 64th WMA General Assembly at Fortaleza, Brazil in October 2013.

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[2] World Medical Association Declaration of Helsinki [revised October 2013]. Recommendations Guiding Medical doctors in Biomedical Research Involving Human Subjects. 64th WMA General Assembly, Fortaleza (Brazil).

Consent Form: For Interviews

Title of Study : The Utility of a Military Advanced Practitioner (AP) within the Pre-Hospital Care Environment

MoDREC Reference: 887/MODREC/18

Please Initial or Tick Boxes

- **The nature, aims and risks of the research have been explained to me. I have read and understood the Information for Participants and understand what is expected of me. All my questions have been answered fully to my satisfaction.**

☐

- **I understand that if I decide at any time during the research that I no longer wish to participate in this project, I can notify the researchers involved and be withdrawn from it immediately without having to give a reason. I also understand that I may be withdrawn from it at any time, and that in neither case will this be held against me in subsequent dealings with the Ministry of Defence.**

☐

- **I understand that interviews will be audio recorded and transcribed at a later date.**

☐

- **I consent to the processing of my personal information for the purposes of this research study. I understand that such information will be treated as strictly confidential and handled in accordance with the provisions of the Data Protection Act 1998 and GDPR 2018..**

☐

- **I agree to volunteer as a participant for the study described in the information sheet and give full consent.**

☐

- **This consent is specific to the particular study described in the Information for Participants attached and shall not be taken to imply my consent to participate in any subsequent study or deviation from that detailed here.**

☐

- **I understand that in the event of my sustaining injury, illness or death as a direct result of participating as a volunteer in Ministry of Defence research, I or my dependants may enter a claim with the Ministry of Defence for compensation under the provisions of the no-fault compensation scheme, details of which are attached.**

☐

- **I understand the compensation arrangements that have been provided.**

☐

Participant's Statement :

I ……………………………………………………

agree that the research project named above has been explained to me to my satisfaction and I agree to take part in the study. I have read both the notes written above and the Information for Participants about the project, and understand what the research study involves.

Signed :   **Date :**

Witness   **Name :**

                              Signature :

                              Date :

Investigator's Statement :

I ……………………………………………………

confirm that I have carefully explained the nature, demands and any foreseeable risks (where applicable) of the proposed research to the Participant.

Signed :   Date :

Authorising Signatures

The information supplied above is to the best of my knowledge and belief accurate. I clearly understand my obligations and the rights of research participants, particularly concerning recruitment of participants and obtaining valid consent.

Signature of Chief Investigator

……………………………………………………   **Date :**

Name and Contact Details of Independent Medical Officer (*if appropriate*) :

Name and Contact Details of Chief Investigator :

Appendix 9 MODREC Clearance

MODREC Secretariat

Building 5, G02,
Defence Science and Technology
Laboratory, Porton Down,
Salisbury, SP4 0JQ

Telephone: 01980 956351
e-mail: MODREC@dstl.gov.uk

Sqn Ldr Liz Paxman   Our Reference: 887/MODREC/18
MTM
RAF High Wycombe 7   Date: 11th July 2019
Baker Avenue RAF
Benson
OX10 6EQ

Tel: 07875514580

Email: Elizabeth.paxman@ouh.nhs.uk

Dear Sqn Ldr Paxman,

The Utility of a Military Advanced Practitioner (AP) within the Pre-Hospital Care Environment

Thank you for submitting your revised application (887/MODREC/18) with tracked changes and the covering letter with detailed responses to the MODREC letter. I can confirm that the revised protocol has been given favourable opinion ex-Committee.

This favourable opinion is valid for the duration of the research and is conditional upon adherence to the protocol – please inform the Secretariat if any amendment becomes necessary.

Please note that under the terms of JSP 536 you are required to notify the Secretariat of the

commencement date of the research, and to provide copies of the consent forms and submit annual and final/termination reports to the Secretariat on completion of the research.

Yours sincerely,

Dr Simon Kolstoe
MODREC Chair

Reply   Reply All   Forward

Approved by Research Integrity and Governance team - ERGO II 46636

ERGOII

To: Paxman E.

11 January 2019 09:37

Flag for follow up. Start by 15 January 2019. Due by 15 January 2019.

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Approved by Research Integrity and Governance team - ERGO II 46636

ERGO II – Ethics and Research Governance Online https://www.ergo2.soton.ac.uk

Submission ID: 46636

Submission Title: The Utility of a Military Advanced
Practitioner (AP) within the Pre-Hospital Care
Environment
Submitter Name: Elizabeth Paxman

The Research Integrity and Governance team have
reviewed and approved your submission.

You can begin your research unless you are still
awaiting specific Health and Safety approval (e.g. for a
Genetic or Biological Materials Risk Assessment) or
external ethics review (e.g. NRES/HRA/MHRA etc).

The following comments have been made:

> Thank you for this information. It is noted
> that you are seeking sponsorship from the
> MoD, and you are obtaining ethics approval
> from MoDREC.

Appendix 10 Transcribing and Coding example AP 1

AP-1
AP-1
Fri, 7/31 2:13PM

39:56 minutes

SUMMARY KEYWORDS
patient, practitioner, capability, role, people, advanced practitioner, hospital, chest, level, operational, working, flying, support, deployed, trained, drain, skills, decision, providing, cardiac arrest

SPEAKERS AP1, liz paxman

L liz paxman 00:00
Thats on a record, thats on record. Only, right, so we are off. So thank you very much for agreeing to take part, as you know, as research is research in advanced practitioners and possible utility in the military pre-hospital space. Understand it also took part in the delphi questionnaire as well. So I've got some additional questions if that's okay about that. Before we get into it, there's no real right or wrong answer any kind of thoughts and opinions, anything that you say will be really useful data. So I've got a few questions, but it's fairly loose. And if you feel that you can't answer them or it's not relevant, or it's not very clear what I'm asking and just let me know and change them. So, ready to begin
00:57
yeah begin
L liz paxman 00:58
couple of questions, then So,can you tell me a bit about your experience as an advanced practitioner in the firm base?

AP1 01:11

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A AP1 01:11
So, two roles, first of all being based in hospital. So, work in an emergency departmentis one of the advanced practitioners there. Firstly is the emergency nurse practitioner and subsequently advanced practitioner and then secondarily, working as a specialist practitioner for South Central Ambulance Service, working in an advanced role.
L liz paxman 01:37
terms of what you do in the firm base, can you describe the Advanced Practice role and in

deployment.

A AP1 01:50

So from a deployment perspective, I've been deployed out to batuk as part of the forward aeromedical capability and not formally tested and Advanced practitioner, but I have used my advanced practitioner skills in that role to see treat, diagnose and make clinical decisions about patients. And if you like an example of that.

L liz paxman 02:13

yes please go on

A AP1 02:15

So as a prime example of that is a patient that was potentially significant. We were told that a significant eye injury was the middle of the night, the patient was flown off the training area because that was the safest option for the patient. And at the handover point, halfway down where I was going to take over the patient's care, and I'd been able to get some updates in flight, and the patient didn't sound like he got a significant eye injury. And it sounded like he possibly had a viral or bacterial infection in the eye. So actually, instead of flying him on to the hospital, I was able to see that patient, assessing, identify that you probably got along viral conjunctivitis rather than significant eye injury and that he could be treated within the primary healthcare facility and bedded down. And, and whilst that seems like a relatively simple clinical decision, actually to fly the patient at nights, put significant risk on the aircraft significant risk of you know, if without a crash or whatever, at nighttime flying somebody who actually didn't need to be flown to hospital and could be treated in an in another healthcare facility. And, and so I think from a clinical decision making, I think those kind of pieces are something that maybe somebody that wasn't an advanced practitioner would have been able to make that decision and wouldn't have been confident making that decision. And so the patient

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ended up in the best place for his care which was in within a primary health care facility. And we didn't generate any further risk because we weren't flying a helicopter hundreds of kilometres at night, with a risk of crashing and killing us and also there was a Huge saving, and probably have a about of 12 and a half thousand dollars for that one. not requiring the patient to be flown and additionally meant that we could remain on task as a capability. And because we went flying, somebody to hospital 200 kilometres away, he really didn't need to go there. So actually, we've increased our operational effect by having an advanced practitioner and being able to see and diagnose a patient there and then

L liz paxman 04:31

So, what are you actually deployed as a default practitioner about particular deploymen

A AP1 04:38

No, I wasn't deployed as an advanced practitioner was deployed as a level five practitioner. And because that's the current capability requirement. The fact that I am an advanced practitioner is a bonus to that role. And I think it's probably one of the roles out there where we're probably the most at risk. We're in a limited environment. We have a significantly Long transfer times to

another medical facility or supporting capability. And therefore having the ability to make clinical decisions outside of normal guidance, I think is a real positive and I think having that when we have advanced practitioners out there for that tour, and patients actually were multiple patients were treated far more effectively than would have been if we just said level five.

L liz paxman 05:28

That's quite interested. And so is there quite a difference then between what you're doing in formerly in a deployed role and what you're delivering in the fan base because you mentioned you work as an advanced practitioner, and the ambulance service and in the hospital.

A AP1 05:48

so an advanced practice role in a hospital is similar to some of the advanced practice roles that the Air Force are trying to get us into, certainly within hospital staging unit. And but I think it's more about independently seeing patients and having the ability to make clinical decisions about these patients on a routine basis, not only about what you think is wrong with them about instigation of treatment management, and either discharge or

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onward referral to a speciality. And, and those roles, swing over into the pre hospital space in my other job as well where predominant, I'm looking to try and keep patients at home by making those clinical decisions for them in the home rather than being transported to hospital for them to have a clinical decision made about them. And for them to have to be returned home. And so that frees up some of the system. And I think in a military environment in a deployed space, the ability to free up capacity, which is generally what we don't have is a huge asset. And so having that perhaps practitioners that can make those sort of decisions and, and are effective in making those decisions is really important.

L liz paxman 07:01

Yeah, that's pretty interesting. So do you think thatwhen you were deployed, you said you weren't deployed as an advanced practitioner, that people really understand what it was you were trying to deliver or what additional capabilities you were able to offer? Was there any issues with that and centre around team working?

A AP1 07:21

And I think from a teamwork in perspective, I think my card is relatively small. So I think those nurses actually saw as, as the dis, this is extra level of decision making that they can support that they wouldn't have had normally in the deployed environment. So, from a team perspective, our junior pre hospital practitioners have somebody who has that more senior decision making capability. There's got an extra level of experience and to hand stuff over to the patient. And not sorry to say from that perspective, I think they've all worked really well because we provide Extra leadership that may not have been there. If you've just got a standard level five practitioner, I think the role is not widely understood. And I think it quite often still surprises fundamentally other clinicians. When you say, Well, you know, I'm gonna make a different decision about that or I'm willing to take a risk on this or that or the other, which is something that maybe they wouldn't have expected to come from a normal level five practitioner.

L liz paxman 08:31

Moving on from that so what do you think inhibits or supports the role, both in the peacetime and deployment of it's quite a big question.

A AP1 08:48

Things that restrict us currently or lack of policy that supports is that is it embryonic, I

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would say at the moment, but we need the policy and then There is some career development pieces that are coming out of DNA Office. But that policy is not really made it into actual practical day to day employment of our practitioners. So in the firm base, I think that's really difficult. In the in the deployed environment, I think, because we've not been there, it's it's identifying what the utility is of those advanced practitioners, I can see the utility, but actually, you've got people that may not work with people that work in advanced practice roles aren't expecting us to have those enhanced skills and then can't see the utility. So I think that is a restriction. Just because fundamentally, some people don't work and don't recognise what to do.

L liz paxman 09:46

They talk about role conflict or lack of understanding of the role.

A AP1 09:51

Yeah, I think, I think it's because it's not very well, the roles not very well defined. And because it's not very well defined, yet. And the policy isn't really supportive of it, but there is there is good education within the civilian sector. You know, we the Royal College of Emergency Medicine. And, you know, so fundamentally, there's a training pathway there. That's, that's recognised by the Royal College. But I think as within a military context, there's no, there's no each of the services has its own idea about it, want what it may want from advance practice. And so that, I think, generates quite a lot of ambiguity within as how people see you, because there's no standardisation. So that does cause issue because one person might be an ST3 registrar level advacned practitioner and other people may have not followed a similar pathway. And it's very difficult to assess

10:51

You mentioned that you can see utility for an advanced practitioner in pre hospital. And can you expand the more on like how that would be defined or where they would fit. If we talked about military pre hospital.

A AP1 10:53

what their level of clinical capabilities

L liz paxman 10:55

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Yes

A AP1 11:12

So, when we look at military pre hospital, we've got quite a gap. We've got a level five practitioners who are an S paramedics who have some experience in PHEC in the Air Force world. That means they've gone through the process and become qualified. And there's quite a distinct gap between that level of practice and then their level eight MERTs today with a consultant and a full team. And I think when you look at some of the more remote places where we operate, and certainly when we look at Batuk and some of the contingency operations that we've been on with Ruman, there were no doctors there. We said no, sent level five practitioners only. And actually, I believe those are some of the most risky places that we actually currently deployed. And actually having that next level decision maker, I think is really important. And the so I see that's where the advanced practitioner sits where we're not willing to send a full level a team out, but yet there is a significant risk. And actually having that enhanced level of clinical decision making, and I think would be really important. Also, when we look to you know, flying on things like puma, when we're splitting a full level 8 MERT down and, and we're looking at which which practitioners go on which aircraft or if you leave a Level 8 and level five practitioner on one aircraft, and you can put potentially a level six practitioner and a level five practitioner on the other aircraft and you split your capability, but you don't necessarily read significantly reduce the clinical capability of either aircraft. And because you've got somebody that could potentially use ketamine, the more advanced airway skills than a normal level five practitioner. And just because they've got that extra level of training, they're a prescriber. And I think that offers flexibility in a world in which we know we're going to have to change what we do if SOP's only work so far. And I think a lot of these environments, we go into relatively fluid, and we're going to need to be responsive to that. And I think that that level six practitioner in the middle provides an increased level of flexibility within any capability. Sorry, certainly, if you look at, you know, that that could be within the land environment. That could be certainly I've worked in the naval environment where that's the case. And then you know, with air is quite off capabilities where the Advanced Practice role sits really, really well.

L liz paxman 13:55

See. So one of the questions What do you think there is a place for level six practice if you're a you're suggesting that advanced practice would sit within level six.

A AP1 14:06

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Yeah, when I look across when I look across where we go we it provides a flexibility and capability because at the moment you've either got a level five team, or you've got level 8 team. And actually the difference in clinical outputs is quite big between those two assets. And you've got limited analgesia limited treatment pathways that are prescribed by PGD and JRCALC are predominantly for level five. And then we go to the other extreme of having a fully RSI capable

level eight team can do surgical procedures and but actually quite often lovely environments that don't necessarily always need that level eight team but I think on the if I looked at risk, the level five team are working at the extremes of their practice, rather than working in the comfort zone of a level five practitioner, and therefore, if you've got the, 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. I think it's a really it's a really difficult game. It's a really difficult kind of process to look at. But I think advanced practice definitely option offers another option within that envelope of capability.

L liz paxman 15:56

what do you think the additional training would be required to deploy it in that role. If that's what you feel, advanced practice should be operating in that pretty much.

A AP1 16:06

Okay, so firstly, I think we have to have people that are actually working in the clinical space. I think we have, you know, if we look at the, the model that's undertaken by our medical colleagues, and they go through their medical training, they might have short bits and pieces here, but they're predominantly clinically focused clinically facing, they go and do a year with phem. And then when they become consultants, they have job roles that are reflective of their operational requirements. So they actually work in the pre hospital space, because their operational role, ask them to be in a pre hospital space. So as advanced practitioners, we need to have a similar model where practitioners are educated to master's level, and they have things that advance history taking non medical prescribing diagnostic reasoning, but they have to have job roles that allow them to flourish and develop their clinical decision making capability, be that in emergency medicine or in the pre hospital space, and that's similar to the roles I have now. And I think that's where you develop your level six capability. So you'll have people that are routinely using sedation of patients in emergency departments, and as things like critical care practitioners in the pre hospital space to provide sedation for straightening of limbs mobilisation of joints, or to for those, those patients who may be combative and who need

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to need to be sedated to make it safe for the aircraft. You know, I've certainly been in Kenya as a as a practitioner, where, you know, I'm having to make decisions about whether it's safe to fly a patient or take them on a road who fought for four hours because didn't have the right drugs together sedate them at time. And I think having having a level six Practitioner with ketamine in that would have made that flight safer. And it would have meant we might not have had to fight struggle with a, you know, a head injury patient in the back of the small helicopter on a, you know, an hour's flight in the middle of the night. So I think that's where it kind of has to sit. And and but educationally we need a pathway that supports that. And we need recognition from commanders that this is that what we're doing and might not be writing a staff paper or sitting in an office or a desk but actually, from an operational perspective. Absolutely. What we're doing is providing the

capability that they've been bang on about in their press releases to the four star So, so, so I'm we're second sorry.

L liz paxman 19:07

Do you feel that you don't currently have that, then you mentioned that you work already in pre hospital and you're already working in the employing that not only

A AP1 19:09

So, no. So we've been very lucky that this is been a pilot studyset up by one of our very forward thinking Nurse Consultant trainees and and so actually the other service has not done that. And I think historically, when we looked at things, we had a training ground that was Afghanistan, and people routinely went out there and we had a real operational focus, and it was almost our training grounds. And I think we don't have that anymore. But actually, that was wrong in the first place. Actually, we should have had people that were working in a pre hospital environment and a confident working in a pre hospital environment, because actually, that's the operational role we're asking people to do. I think, for far too long. We've looked at people working in the emergency See department as a as a one for one swap into the pre hospital space. And I think there are transferable skill sets. But actually you need people that are routinely working in that clinically, base in pre hospital space working at an advanced level in the UK, which is exactly what we do with our level eight practitioners to be able to support the level five practitioners.

L liz paxman 19:13

is that not formally done currently.

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A AP1 20:40

So he said that again, that's kind

L liz paxman 20:42

Okay. And that's about it. Loads of really valuable information is there anything before I move on some of the delphi questions Is there anything else that you wanted to add the advanced practitioner questions before that you wanted to add before we move on to the next section, which is just a question about delphi and the level six questions

A AP1 21:03

I think I think within the Advanced Practice world, I think we need to look at how already said about how we employ our people but also how we manage them in the nurse in the nursing world. I think even whilst my 1RO or 2RO are trying to understand what I do, it's very difficult for them to understand what we do and I think, possibly and I don't know whether, you know, whether from an oversight perspective and a developmental perspective, whether we should as advance practitioners come formally under the defence school, or come under the EM community, because we're effectively working as junior doctors and working through the competencies of specialist practitioners in hospital and out of hospital and along the same lines is our training doctors. And I think there's a far greater understanding of what those requirements are from, from that viewpoint, and I don't know whether, you know, if we're selecting people to go this route, that actually we should utilise that chain of command development and

management to support these people a little bit more than then the ad hoc way that it's done at the moment.

L liz paxman 22:26

Just to expand on what do you mean by ad hoc way

A AP1 22:31

So, so I say there's no fancy practitioner, going through my master's, I've had to find my own consultant assessor. And to do or to do all the supporting systems piece that our medical colleagues going through similar training, tried to sign off similar stuff, have as part of their, their educational supervisors role, etc. And I think we haven't really formalised how That works for our advanced practitioners across defence. And if we're going to try and hit the civilian benchmarking, we need to have kind of civilian standards of support. And I think at the moment because defence doesn't have that within its

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nursing capability, I think possibly it would be, it would sit better if, whilst we're still in nursing pids to have that oversight management by our medical colleagues, because there's almost it almost provides a secondary benefit, because actually, they see that we're meeting the same standards. And I'm sure from the DCA perspective, if they can see that you've met the same standards as an ST3 medical registrar. Because you've fulfilled the RCEM capability, I think, and you've gone through the same process as those junior doctors. I think that would add a lot of crediability to what we do, because I don't think that is always the case.

L liz paxman 24:09

Okay. So I know you took part in the delphi questioner obviously it's completely anonymous so I don't know what you answered what you didn't answer but collectively, there was much debate about a couple of things that I'm going to ask you about now. And in the short answer boxes. And also, when I total up the votes on what should sit in what level, there wasn't full consensus reached so for that reason, I feel like I need to expand on some of those questions to actually just understand a bit more in depth why that might be. So it's already if there's anything you know, you don't really want to comment on or you're not sure just say. So the first thing, and was really around how you would manage chest injury. So this is how the level six practitioner managed chest injury over 24 to 48 hours so like a prolonged fieldcare environment. This is really around a sort of mismatch of consensus about chest drain. So,

A AP1 25:18

so I think that while chest drain is part of the ACP pathway and hospital is part of a competency skill set and so free, we have advanced practitioners, I would expect them to be able to put those chest drains in and have that as a competence. And I could see the problem if you've only got a level five practitioner, you know, if you've got somebody with a recurring chest injury, they're unable to put a chest drain and you're going to have to potentially continually put a needle in their chest to decompress it because that is your only option. I think having advanced practitioners

L liz paxman 25:51

specific for just a generic level six, if you were level six practitioner. How would you manage a chest injury for 24 to 48 hours and if you feel like a chest drain is the requirement or you don't feel

like prep everyone should be trained in chest drain how would you manage a chest injury for 24 to 48 hours

A AP1 26:08
i think i think there's a level of clinical decision making is your patient stable enough? Can you manage them without doing that procedure but I think you feel deployed deploying level six practitioner and you're gonna have to hold a patient for 48 hours, then I would expect the level six practitioners should be able to put a chest drain into a patient. And because actually, that's an expectant. For me, that's an expectation. I'll get my words out. For me. It's expected standard of care.

L liz paxman 26:41
Okay, so you feel like level six competencies should be to competent to undertake chest drain insertion if it is required.

A AP1 26:50
Yes.

L liz paxman 26:52
Is there any other techniques that you can think of, to manage a chest injury that might be useful to be treated

A AP1 27:03
See, I mean, it is clearly I think we've already got needle decompression and asherman chest seal a thoracostomy, but clearly that's not going to work really on an awake patient or a non ventilated patient. So I think having having skillsets to a thoracostomy should your patient deteriorate and arrest potentially, and having I think part of the issue is that we don't have seldinger kits within the military. So we don't have seldinger chest drain. So we have a chest normal chest drain set. And, and so I think the skill set has to be has to be equivalent to the equipment that is in defence. Now if you're going to say we're level six practitioners could then put a seldinger type, chest drain in instead because it's slightly less traumatic for the patient. If you don't need to put yourself at risk, etc, then I think that's another option. But I think when we look at the actual equipment that we've got, we've got chest drains, trauma, chest drains and trauma chest drain kits. And so you've got to be capable of putting those in.

L liz paxman 28:17

Okay, great. So, in regards to pre mortem c section should a level six be qualified in this, what are your thoughts through the likelihood and. Do you think this is something that all level six should be

trained in undertaking.

A AP1 28:34

I've kind of, it's not in my normal scope of practice. But actually, if you've got if you've got a patient who's in cardiac arrest and you've got an option of saving the baby, then I can't see that being a problem. Like if the mother's dead already on the baby's going to die, then the worst thing then The worst thing that can happen for a pre mortem c section is that the baby dies. But if you do nothing the baby dies. So or actually you get the baby out and you can save the mother. So I can see with with

L liz paxman 29:17

Is this a likely thing in the hospital care. I think as we push towards humanitarian type work, then yes, potentially it could be. So you look at some of the places we've been to with hurricanes, etc. On Rumon where we've got practitioners forward. We've not got a level eight practitioner there, but actually you've got, you've got the hospitals destroyed. What do you do? Like do you do you go ahead and see if you could save that baby anyway because their mother's clearly dead. Or do you do nothing and let the baby die as well? I think it's a really it's quite an ethical decision, but I think as a level 6 practitioner. This is not a I don't think this is this is a absolute life saving procedure for the child and potentially a life saving procedure for the mother. do you think that everyone at level six should be trained in how in c section or have an introduction.

A AP1 30:12

At some point in your trauma care i think i think i think people should be trained in postmortem c section. Because I think in a world of doing no harm, actually that one action can can actually save a life. And it's something that I don't think it's a complicated procedure. You're not trying to do something aseptically you're just trying to get a baby out of a mommy's tummy in a way that keeps the Baby Alive. And so I can't see a downside to having people trained in that and how that training is completed, and the competency of, I think is something that's difficult. But I think when I look at most pre hospital practitioners in the UK, that's a very rare occurrence, but yet they maintain their competency in that so

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L liz paxman 31:18

Okay. That's great. So, this is probably one of the most debated skills from the delphi study, what level of advanced airway skills should a level six need, and should they be competent to perform an intubation without drugs, just to be clear.

A AP1 31:43

Yeah, I think in my current role, I'm expected to do an intubation without drugs on a cardiac arrest patient. So I don't think having that as a level six skill. Clearly if you can, if you can manage a patient in an ijel. And that's the safe way to manage that patient and it's an effective way to manage patients. That's absolutely fine. But if you've got an option of a more definitive airway, and certainly working in a small team environment, sometimes having that additional their way frees up capacity. You know, if you're working with two people on a helicopter, and somebody's got an eye gel, somebody is going to have to monitor that iJel pretty closely, where as soon as you've got a patient tubed, we can put them on a ventilator, it's a little bit easier to manage their

airway in cardiac arrest. So in the operational world, having the ability to intubate without drugs, yes, I think is a skill that you should have is level six practitioners. And I don't, you know, even to the point of post rosc. And if you've got someone who's intubated, then giving them a paralysing agent to keep them intubated as a level six. I think that's a potentially something that we should have as a skill set as well.

L liz paxman 32:58

Is there any other reason why you think intubation is important to have as definitive airway over lgel.

A AP1 33:08

When you're looking at some of our patients such they may have trauma to the face like or other airway problems that you you ultimately know the patient needs that airway. And I think certainly again, for things like blast lung, you can't, you can't really apply a lot of peep down and I gel, there's only a certain amount. So if you've got a problem with a chest, certainly post cardiac arrest, then there's potential that you're going to need that extra you're going to need that ET tube to be able to manage the patient appropriately, or give them the best chance of survival anyway. And so, I think having that skill set is important.

liz paxman 33:55

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L liz paxman 33:55

And in terms of, USS should level six practitioners be trained in it, and what areas specifically do you think they should be trained in ultrasound.

34:08

yes, I think given our operational environment, having the ability to ultrasound the chest and look for the chest injuries in flight and look and see if the lung up is, is if the lungs are up or if there's a chest injury, I think that's pretty important. And because it will change, it might change your decision making in that pre hospital space for that patient. And it might change the flight profile that you're willing to fly, which might change fuel it's got lots of other implications that if you know that they've not got chest injury, while you you might be able to get a height and make it safer flight for you, certainly in the operational space. So, ultrasound of chest, heart, I think it would be really useful, specifically in traumatic cardiac arrest to see you've actually you've got any, any heart movement because, again in a limited operational environment, if somebody If somebody is in traumatic cardiac arrest, they're aystole and they've actually got no heart movement at alll that might change your management of that patient and the decision making to use blood and other products on that patient in a limited distance environment where we have to think about is this patient going to survive, even if I use all my resources? So I think from a resource perspective, that would be useful. And again, I think it's familiarity and having people that are competent and are using ultrasounds in their UK practice to make that work. I don't think it's something that you can train for one day and expect somebody to use in three years time, I think it's got to be a skill set that's trained. So chest and for potentially for access or difficult access, you could, you know, again, that's routinely used now within emergency medicine

departments are actually having people that you know, somebody with difficult access or a child Maybe you've not got access to an IO, but you can get a line in. And, and or, you know, also in the pre hospital space, if you've got somebody held for a while, while diagnostically, you can't rule out anything in the abdomen or a bleed in the abdomen. And if you can't see anything on an abdominal ultrasound, if you have got blood and fluid, you know that that patient is going to need surgical capability quicker. And again, that might change your decision making in the pre hospital space as to do you over fly a small role one capability to get to a surgical capability because you know that the patient's already bleeding so I think it's got lots of upsides to help decision making but only if the people that are using it are trained and current

L liz paxman 36:51

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Okay, last question, you'll be pleased to hear. So, and what role should be recognised and step level six nurse GP or paramedic.

A AP1 37:06

So I think it's less of, I think it's less about it's less about what bad shoe wear or what, what background you come from. It's about having somebody excuse me. It's more about having somebody that's capable of delivery of the skills that you're asking the level six to produce. So if you've got a nurse who is working in the critical is a critical care paramedic and is already providing all those skills and routinely using them then they should be able a level 6 the same that could be said for a paramedic and or a GP, if they're working on an air ambulance and they're providing that skill sets. And, but they have to be working in a space that's regularly providing that capability. They have to be competent at that decision making and delivery of all the skills that a level six needs. And I think that's more important than what what training I've had or which badge cap badge that I wear on a day to day basis. Because it's, you know, it's about delivering care to the patient first, not about where where we get these people from who are capable of delivering the role.

L liz paxman 38:19

Sweet. Thank you very much for that it's really insightful if you've got any more thoughts, or any final comments.

A AP1 38:35

I think we certainly certainly from my branch, we've got people who are really highly trained. were pushing towards having people that are able to deliver at this level. Actually, we just need the policy strategic oversight to support that development. And I think that development is hand in hand with the operational model. we're being asked to produce. I think, historically, like I said earlier, and we've forced people into working in specific places because we thought that was a good thing for them to do. And actually, what we need to really do is look at what we are providing operationally, then from a governance perspective and deciding what the minimum standards are for those people that are going to provide that care in the operational environment. And then having people that have an appropriate career pathway, job, spine and employment, to meet that operational requirement, and I think some of that is still lacking. Right now.

L liz paxman 39:44
Okay. I'm just going to switch of recording thank you very much for your time. And if you

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need me for anything further my contact details.

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Appendix 11 Level 5-6 Competencies

Level 5/6 PHEC Scope Practice

Forward

This document aims to provide an overview of levels 5 and 6 PHEC Practitioner Scope of Practice. It will provide clear and definitive information on the capabilities of levels 5 and 6 PHEC. By defining the boundaries of practice within which a level 5 and 6 PHEC practitioner must operate. This document supports appropriate and effective patient care that minimises clinical risk to patients, practitioners and the organisation.

PHEC Level 5

For this document, Level 5 practitioners are Nurses (EM) or Paramedics. All practitioners are trained and experienced in pre-hospital care. Level 5 practitioners must be in date MPHEC, BATLS and CPD/CCE requirements, including appropriate pre-hospital exposure for Nurses. Depending on role, Level 5 practitioners will be appropriately qualified in Fwd MEDEVAC.

PHEC Level 6

Practitioners are either MOs, EC qualified nurses or Paramedics. All nurses and paramedics must be MERT qualified. Paramedics and EC Nurses are specialist pre-hospital practitioners, having undertaken additional advanced practice training to achieve level 6. They are identified as Advanced Pre-Hospital Emergency Care Practitioners (APhecPs)

This scope of practice has been developed to align with Defence Operational PHEC levels. It enables the organisation to define the clinical capabilities of level 5/6 practice. Furthermore, this document will inform broader organisations of what skills and competencies these practitioners hold. It will be used to support continuous professional development, continuous clinical exposure, and the ability to deliver high-quality clinical care to patients.

It is not intended that this document will remain static; as the Defence Medical Services adapt to meet future global challenges in diverse operational environments, the role of PHEC practitioners must continue to evolve to match the changing landscape, remaining agile and adaptable to be a world-class medical service in support of airpower.

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Authority

The RAF PHEC level 5/6 Scope of Practice is owned and endorsed by ??

Review

The level 5/6 Scope of Practice will be subject to a biannual review, or when a significant change DCA, CA PHEC, SNA Advanced Practice, DSA paramedics, EM, SNA EM are responsible for the review and maintenance of this document.

Glossary

APhecP Advanced Pre-hospital Care Practitioner
AHP Allied Healthcare Professional
ALS Advanced Life Support
AP Advanced Practitioner
APP Advanced Paramedic Practitioner
BATLS Battlefield Advanced Trauma Life Support
CCE continuous clinical exposure
CCP Critical Care Practitioner
DIMC Diploma Immediate Medical Care
DMS Defence Medical Services
EC Emergency Care
EM Emergency Medicine
eFAST Extended Focused Assessment with Sonography for   Trauma
FPHC Faculty Pre-Hospital Care
MO Medical Officer
NTS non-technical skills
PHEA Pre-Hospital Emergency Anaesthesia
PHEC Pre-Hospital Emergency Care
PHEM Pre-Hospital Emergency Medicine
POCUS Point of care ultrasound

Introduction

Defence PHEC resources are aligned in military policy against eight levels of capability, the Defence Operational PHEC Levels (DOPL). The required DOPL of care are

determined for each exercise or deployed operation based on the associated level of risk to life and limb. The DOPL are derived from the NHS skills for health framework, which uses broad definitions to outline career pathways across various roles ranging from initial entry jobs to clinical directors. The DOPL entry level is a level 1, basic first aider/medic, progressing to a level 8, a consultant who has subspecialised in PHEM. The DOPL levels are effectively aligned to clinical capabilities, and this document will provide the Scope of Practice definition for the clinical role of a level 5/6 practitioner, outlining specific knowledge, skills and experience associated with the role and the boundaries of practice within PHEC practice.

Scope of Practice

PHEC Level 5

This document aims to provide guidance to Level 5 practitioners, their line managers and operational medical planners. It will clarify to all level 5 practitioners their roles and responsibilities in relation to providing safe, quality patient care. In addition, to the practitioners and their line managers, the requirement for CCE to maintain skills both in the deployed and firm base setting.

PHEC Level 6

Practitioners could be MOs, EM qualified nurses or Paramedics who possess the relevant KSE and currently undertake relevant PHEC CCE as part of their job plan[1]. To enable the required clinical enhancements, training via established UK educational opportunities used to upskill this sub-cadre. Paramedics and EC Nurses who complete this pathway are identified as Advanced Pre-Hospital Emergency Care Practitioners (APhecPs). The primary operational employment for APhecPs would be as the clinical lead on a Level 6 Fwd AE Team or as the clinical second on a MERT. APhecPs are able to deliver a range of enhanced skills associated with level 6 practice including surgical airways, thoracostomies, ketamine sedation and advanced drug delivery (magnesium, inotropes, intranasal analgesia) in addition to advanced decision making, enhanced diagnostic skills and independent prescribing.

		CORE PHEC 5 ELEMENTS
○ **Understanding the training and regulation of pre-hospital personnel**	1.1.1	List the range of pre-hospital personnel
	1.1.2	Describe the medical capabilities of different pre-hospital personnel

1.2 Work effectively with emergency services	1.2.1	Describe the roles and responsibilities of the emergency services found in the firm base and deployed environment:
	1.2.2	Describe and contrast the incident command structures of the firm base and deployed environment:
	1.2.3	Explain the medical capabilities of the emergency services in the firm base and deployed environment:
	1.2.4	Demonstrate an understanding of JESIP
1.3 Understand the process of ambulance emergency call handling, prioritisation, dispatch categorisation and resource management	1.3.1	Describe the processes of dispatch in the firm base and deployed environment:
	1.3.2	Describe Ambulance Response Programme (ARP) and NATO targets
1.5 Understand the law relevant to pre-hospital care	1.5.1	Understand lawful consent to treatment for adults and children
	1.5.2	Understand lawful refusal of treatment for adults and children
	1.5.3	Explain the legal basis for the emergency treatment of the incapacitated patient
	1.5.4	Understand the circumstances in which confidentiality may lawfully be breached
	1.5.5	Describe the legal requirements related to deaths outside of hospital
1.6 Work effectively with acute hospital services	1.6.1	Categorise acute hospital services
	1.6.2	Describe the process for accessing services in the firm base and deployed environment.
1.7 Safety and Approach to a scene	1.7.1	Demonstrate how to safely approach the following scenes in the firm base and deployed environment
		• Private address
		• Public place
		• Road Traffic Incident
		• Major Incident
		• Chemical Biological Radioactive Nuclear incident
2.1 Assess patients in pre-hospital care	2.1.1	Describe how interpretation of an incident scene may influence patient assessment
	2.1.2	Describe the environmental factors which might impact upon clinical assessment in the following situations:
		• Private domestic
		• Crowded public
		• Geographically isolated
		• Environmentally exposed
		• Multiple patients
		• Patient is newborn, infant or child
		• Hazardous, unsafe or combat

		• High expressed emotion
		• Personally emotive
	2.1.3	Understand the risks of lone working
	2.1.4	Understand the role of monitoring and investigations in assessing patients of all ages
	2.1.5	Demonstrate ability to perform structured and focussed assessment of adult and paediatric patients in the pre-hospital environment
	2.1.6	Demonstrate ability to accurately interpret clinical history, physical signs, monitoring and investigations in the pre-hospital environment in patients of all ages
	2.1.7	Demonstrate the ability to balance risk and benefits of actions prior to full patient assessment
	2.1.8	Demonstrate respect for patients privacy and dignity during patient assessment or intervention
	2.1.9	Demonstrate effective communication with patents and family
2.2 Provide immediate pre-hospital clinical care	2.2.1	Critique the sequence and objectives of immediate clinical actions in managing critically unwell patients
	2.2.2	Demonstrate the immediate pre-hospital clinical actions in all age groups for managing and supporting:
		• Airway
		• Breathing
		• Circulation
	2.2.3	Demonstrate current best practice in managing acute pain and distress within the pre-hospital environment
	2.2.4	Demonstrate a structured primary assessment
	2.2.5	Display a calm and methodical approach to providing immediate clinical care
2.3 Provide cardiopulmonary resuscitation in the pre-hospital environment	2.3.1	Recognise the clinical features of impending cardiac arrest
	2.3.2	Understand the role of CPR in pre-hospital care
	2.3.3	Describe and demonstrate use of the current United Kingdom Resuscitation Council guidance on CPR and emergency cardiovascular care for all age groups in the pre-hospital environment
	2.3.4	Describe indications for pre-hospital:
		a. Resuscitative thoracotomy
		b. Peri-mortem caesarean section
	2.3.5	Demonstrate ability to lead a cardiac arrest team in the pre-hospital environment
	2.3.6	Demonstrate ability to make rational end of life decisions in place of a DNAR and escalate the requirement of cessation of CPR
2.4 Manage acute medical emergencies in the pre-hospital environment	2.4.1	**Demonstrate AN UNDERSTANDING OF the recognition and management of the following acute medical conditions:**
		a. Airway obstruction / choking / stridor
		b. Acute breathlessness
		c. Acute chest pain

		d. Hypotension and shock
		e. Palpations and cardiac arrhythmias
		f. Acute headache
		g. Acute vomiting
		h. Acute abdominal / loin / scrotal pain
		i. Acute confusional state
		j. Collapse / Transient Loss of Consciousness
		k. The unconscious patient
		l. Intoxication and poisoning
		m. The fitting patient
		n. Acute allergic reaction
		o. Acute non-traumatic back pain
		p. Sudden weakness / paralysis / abnormal sensation
		q. Acute visual disturbance
		r. Acute febrile illness
		s. Acute gastrointestinal haemorrhage
		t. Acute limb pain and/or swelling
		u. Acute rash
		v. Acute haemoptysis
		w. Acute epistaxis
		x. Acute pain
		y. Acute thermal illness
		z. Bites, stings and envenomation
	2.4.2	**Understand the pre-hospital management of IAW CGOs:**
		a. Anaphylaxis
		b. Asthma
		c. Coronary heart disease
		d. Sepsis
		e. Meningoencephalitis
		f. Stroke
		g. Diabetic ketoacidosis
	2.4.3	Demonstrate the ability to formulate a differential diagnosis for an acute medical presentation
	2.4.4	Describe and demonstrate the use of guidelines for safely discharging medical patients at scene
	2.4.5	Discuss appropriate use of alternative care pathways for medical patients
2.5 Manage injury in the pre-hospital environment	2.5.1	Describe and understand the procedures of the local trauma system
	2.5.2	Describe and contrast the pathophysiology of of injury in all age groups
	2.5.3	A. Adlult blunt trauma B. Adult penetrating trauma C. Paediatric blunt trauma D. Paediatric penetrating trauma E. Elderly "silver" trauma

	2.5.4	Describe the influence of injury mechanisms on anatomical injury patterns
	2.5.5	Describe and demonstrate the principles of pre-hospital management of patients across the spectrum of injury severity
	2.5.6	**Demonstrate AN UNDERSTANDIING of the pre-hospital management of the following:**
		a. Head injuries
		b. Facial injuries
		c. Neck injuries
		d. Thoracic injuries
		e. Abdominal injuries
		f. Spinal injuries
		g. Pelvic injuries
		h. Limb injuries
		i. Injuries involving multiple body regions
		j. Thermal injuries
		k. Electrocution
		l. Ballistic and blast injuries
		m. Traumatic asphyxia
		n. Dysbarism
		o. Crush injury
		p. Fallen patient
	2.5.7	**Demonstrate AN UNDERSTANDIING of current best practice for all ages in pre-hospital:**
		a. Airway management inc. Airway adjuncts, needle cricothyroidotomy and surgical airway
		b. Ventilatory support
		c. Haemorrhage control
		d. Fluid resuscitation inc administration of blood products
		e. Spinal immobilisation
		f. Neuroprotection
	2.5.8	Demonstrate the ability to formulate a differential diagnosis for injury / traumatic presentations
	2.5.9	Describe and demonstrate the use of guidelines for safely discharging injured patients at scene
	2.5.10	Demonstrate appropriate use of alternative care pathways in injured patients
2.6 Provision of Analgesia	2.6.1	Demonstrate the assessment of pain in the pre-hospital environment across all ages
	2.6.2	**Consider and demonstrate AN UNDERSTANDIING use of different analgesic preparations and routes of administration across all patient groups**
2.7 Manage obstetric emergencies in the pre-hospital environment	2.7.1	Describe the anatomic and physiologic changes of pregnancy
	2.7.2	Describe the stages of labour, the process of delivery and common complications
	2.7.3	**Understand pre-hospital management strategies for:**
		a. Ante-partum haemorrhage

		b. Post-partum haemorrhage
		c. Normal delivery
		d. Breech delivery
		e. Cord prolapse
		f. Shoulder dystocia
		g. Ectopic pregnancy
		h. Severe pre-eclampsia and eclampsia
2.8 Manage the newborn in the pre-hospital environment	2.8.1	Describe the applied physiology and anatomy of the newborn
	2.8.2	Describe and demonstrate the initial care of both term and pre-term newborn
	2.8.3	Demonstrate resuscitation of the newborn in the pre-hospital environment
	2.8.4	Demonstrate the ability to recognise the emotional needs of mother and family
2.10 Manage acute behavioural disturbance in the pre-hospital environment	2.10.1	Understand the signs of mental health disorders presenting as pre-hospital emergencies
	2.10.2	Describe acute mental health service provision across DMS
	2.10.3	Appreciate the possibility of similar presentations fot organic brain syndromes from acute psychiatric illness
	2.10.4	**Demonstrate ability to undertake a pre-hospital:**
		a. Mental state examination
		b. Self harm risk assessment
		c. Suicide risk assessment
		d. Violence risk assessment
2.11 Provide end-of-life care and immediate management of bereavement	2.11.1	Describe the management of a pre-hospital death involving:
		a. An adult
		b. An infant or child
		c. Multiple casualties
		d. An expected death
	2.11.2	Describe the variations in approach to death among different cultural groups
	2.11.3	Understand and administer end-of-life medications as required
	2.11.4	Demonstrate the ability escalate and manage end-of-life decisions
	2.11.5	Display a professional and sensitive approach to relative and colleagues
3.3 Examinations of systems	3.3.1	**Demonstrate ability to examine the following systems and use associated equipment where needed:**
		a. Central Nervous System
		b. Peripheral Nervous System
		c. Respiratory system
		d. Cardiovascular system
		e. Abdominal examination
		f. Musculoskeletal examination
		g. ENT inc. otoscope
		h. Eyes inc. ophthalmoscope

3.4 Management of conditions that do not require hospital attendance	3.4.1	**Demonstrate an understanding of the management of conditions NOT requiring transport to an MTF.**
3.5 Medicines management	3.5.1	Understand and demonstrate knowledge of DMS medicines processes for the handling of supply medications
	3.5.2	Demonstrate use of PGD to supply medicines
	3.5.3	Demonstrates appropriate use of antibiotics
4.1 Apply equipment governance principles and practice	4.1.1	Describe the principles of equipment governance
	4.1.2	Describe the regulatory framework for medical devices
	4.1.3	**Demonstrate a professional approach to equipment governance procedures:**
		a. In the pre-deployment phase
		b. During deployment and clinical care
		c. On completion of deployment
4.2 Understand and use personal protective equipment (PPE)	4.2.1	Categorise PPE
	4.2.2	Describe the principles underlying PPE function and design
	4.2.3	Describe when to use and demonstrate correct use of PPE
4.3 Operate all types of commonly used pre-hospital equipment	4.3.1	**Demonstrate how to check, maintain and confidently use:**
		a. Airway management devices
		i. OPA
		ii. NPA
		iii. iGel
		iv. PHEA Assist
		v. Suction units
		a. Ventilatory support devices
		i. BVM
		ii. Ventilators
		iii. Needle decompression devices
		a. Haemorrhage control devices
		i. Blast dressing
		ii. Celox
		iii. Tourniquets
		a. Circulatory devices
		i. Cannulae
		ii. EZ-IO
		iii. Giving sets
		iv. 3 way tap
		a. Dressings
		i. Burns dressings
		a. Devices for immobilising joints, limbs and patients
		i. Box splints
		ii. Vacuum splints
		iii. T-Pod
		iv. Kendrick Traction Device

		v. C-Spine collar
		a. Monitoring and defibrillation equipment
		i. Zoll uni/ Tempus / CORPULS inc. NIBP, SpO2, ETCO2, ECG, Defibrillation
		i. Interpret a 12 lead ECG
		i. Blood glucose
		ii. Tympanic thermometer
		a. Moving and Handling Devices
		b. Communications devices
4.4 Manage and administer medicines	4.4.1	Describe and demonstrate the processes for stocking, safe administration and checking of STAT medications in DMS
	4.4.2	Describe the regulatory framework for medicines in pre-hospital practice
	4.4.3	Describe and demonstrate compliance with the storage and administration of controlled drugs in DMS
	4.4.4	Describe the dangers of medical gases used pre-hospital care, their storage and administration
5.1 Support Extrication	5.1.1	Describe the principles of extrication and management
	5.1.2	Describe medical interventions that can support extrication
	5.1.3	Critique the capabilities of equipment and technical process of extrication (REME and Civ)
	5.1.4	Demonstrate ability to make rapid assessment of the extrication needs of the trapped patient
5.2 Clinically manage the trapped patient	5.2.1	Describe the adverse physiological effects specifically associated with entrapment
	5.2.2	Describe pain management strategies for the trapped patient
	5.2.3	Describe clinical strategies for the management of trapped patients with:
		a. Impalement
		b. Crush injury
		c. Hypothermia
		d. Prolonged entrapment
		e. Severe limb entrapment
6.1 Prepare patients for transfer	6.1.1	Critique different transport modalities (road vs helicopter) to transfer a patient to hospital
	6.1.2	Describe and demonstrate pre-transfer measures to minimise risk during transport including correct preparation of the patient
	6.1.3	Demonstrate ability to determine when patients are in their optimal state for transport
	6.1.4	Describe and demonstrate who (staff, relatives) should or should not travel with the patient
6.2 Clinically manage patients during transport	6.2.1	Describe what clinical interventions are possible during transport
	6.2.2	Demonstrate transport of the critically ill patient, including the management of mechanically ventilated and spontaneously breathing patients in accordance with local guidelines and standards
	6.2.3	Describe the specific clinical management during transport of:

		a. Patients with major head injuries
		b. Patients with contagious diseases
		c. Patients with unstable spinal or pelvic fractures
		d. Patients with major burns
		e. Patients who are pregnant
		f. Patients who are children / infants / newborn
		g. Patients with behavioural disturbance
	6.2.4	Demonstrate ability to manage sudden in-transit loss of:
		a. Airway control
		b. Oxygen
		c. Vascular access
		d. Monitoring
		e. Infusions
		f. Power
6.3 Pre-arrival and arrival at hospital	6.3.1	Demonstrate ability to perform an ATMIST Pre-Alert Telephone call or radio signal
	6.3.2	Demonstrate ability to perform face to face handover at hospital
7.1 Understand principles of emergency preparedness, response and recovery	7.1.1	**Define, in the context of emergency planning:**
		a. Preparedness
		b. Response
		c. Recovery
	7.1.2	Categorise classes of major incident
	7.1.3	List the capabilities of services and agencies involved in emergency preparedness, response and recovery
7.2 Responding to Major, Mass or Multiple casualty incidents	7.2.1	**List the duties of the following at Bronze, Silver and Gold command levels:**
		a. Ambulance commander
		b. Medical commander
		c. Police commander
		d. Fire commander
	7.2.2	**List the duties of the following:**
		a. Safety Officer
		b. Loading officer
		c. Equipment officer
		d. Communications officer
		e. Parking officer
		f. Casualty clearing officer
		g. Primary Triage officer
		h. Secondary Triage officer
		i. Body holding area doctor
	7.2.3	Critique and demonstrate ability to undertake Triage Sieve and Sort
	7.2.4	Critique the role of the media at major incidents
7.3 Manage chemical, biological and radiological	7.3.1	Demonstrate safe approach to a suspected CBR agent incident
	7.3.2	Demonstrate correct selection and use of PPE for initial management of a suspected CBR incident
	7.3.3	Describe strategies for pre-hospital decontamination

(CBR) emergencies	7.3.4	**Describe the clinical features and pre-hospital management of:**
		a. Chemical agent exposure
		b. Biological agent exposure
		c. Radiation agent exposure
8.1 Understand human factors and their role in patient and team safety	8.1.1	Define the concept of human factors
	8.1.2	**Describe the potential impact on patient and team safety of:**
		a. Human factors
		b. System factors
		c. Organisational factors
		d. Cultural factors
	8.1.3	Demonstrate Team Resource Management
8.2 General aptitudes	8.2.1	Demonstrate good Clinical Governance
	8.2.2	Display concept of situational awareness

Adapted from the Intercollegiate Board for Training in Pre-Hospital Emergency Medicine Curriculum 2015.

Optional PHEC L5/Role1 Competencies

UNIT		OPTIONAL PHEC 5 ELEMENTS
3.1 Wound management	3.1.1	Critique and demonstrate the use of the range of wound dressings available in DMS
	3.1.2	**Critique and demonstrate the use of the following methods of wound closure:**
		a. Wound adhesive
		b. Wound closure strips
		c. Sutures
		d. Staples
		e. Hair Apposition Technique
	3.1.3	Describe the indications for use of dissolvable sutures

	3.1.4	Demonstrate knowledge of how to access ongoing wound management
3.2 Catheterisation	3.2.1	Understand criteria for undertaking catheterisation
	3.2.2	**Demonstrate ability to prepare and insert:**
		a. Male catheter
		b. Female catheter

PHEC Level 6 Competencies

UNIT		PHEC 6 ELEMENTS
		All PHEC Level 5 Core Competencies
	1.1.1	Advanced airway management
	1.1.2	Finger thoracostomy
	1.2.1	Management of pneumothoraces over extended timelines
		Use of pre-hospital imaging techniques eFAST (Extended Focused Assessment with Sonography for Trauma)
		Reduction of fractures where appropriate
		Administration of inotropes
		Administration of paralysis post cardiac arrest in ROSC
		Procedural sedation using ketamine
		Cardiac pacing
		Use and administration of CPAP ventilation
	1.2.3	Can perform mechanical and chemical cardioversion
	1.2.4	Can undertake transport of the critically ill patient, including the management of mechanically ventilated and spontaneously breathing patients in accordance with local guidelines and standards

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[1] Emergency Medicine Consultants are the exception to the requirement to have PHEC within their job plan to be recognised as Level 6 PHEC.

Appendix 12 Staff Papers

1. Defence AP strategy and Framework document draft Mar 23
2. RCEM and military course mapping document Mar 23
3. Terminology for AP roles in Defence (example of military staff work below.

14 Mar 23

TERMINOLOGY FOR ADVANCED PRACTICE (AP) ROLES WITHIN DEFENCE

Introduction

1.   The NHS has seen a surge in Advanced Practice (AP) roles, highlighting advantages for the workforce, including increasing skill mix, providing resilience, and offering a clinical development pathway.

2.   This growth led the sSs to train a small number of nurses in AP for clinical development in around 2010. There are, however, few identifiable roles associated with liabilities within the DMS. For example, AMS has trained APs to perform the role of Military Nurse Practitioners (MNP) and, in the RAF, Advanced Nurse Practitioners (ANP) for the HSU.

3.   These varying role terms and sS requirements for APs to fulfil different capabilities have resulted in a degree of uncertainty and confusion, as well as a restriction of the development of Advanced Clinical Practitioners (ACP) across the DMS. This note recommends role terminology for the DMS to assist with definition and standardisation.

Background

4.   AP is an evolving level of clinical practice in healthcare, resulting in new roles for nursing and allied healthcare professionals (AHPs), including paramedics, pharmacists, and physiotherapists. Healthcare professionals at this level are trained to work autonomously, developing skills and knowledge to operate beyond their previous scopes of practice. These practitioners have Masters' level educational, and, after credentialing, they are collectively known as Advanced Clinical Practitioners (ACP) or Advanced Critical Care Practitioners (ACCP)[1][2].

5.   Advanced Clinical Practice is defined by Health Education England as;

"Advanced clinical practitioners come from a range of professional backgrounds such as nursing, pharmacy, paramedics and occupational therapy. They are healthcare professionals educated to Masters level in and have developed the skills and knowledge to allow them to take on expanded roles and scope of practice caring for patients" [1].

6. Despite the increase in AP roles over the last 20 years, ranging from Nurse Practitioner to Consultant Nurse, there has been little in the way of standardisation[3].

7. In response to this, they are affiliated with the Royal College Emergency Medicine (RCEM)[4]. or the Facility of Intensive care Medicine (FICM). The work undertaken by RCEM and FICM complements the National definition for ACPs/ACCPs, which outlines a multi-dimensional foundation, and conceptualises the role into four pillars of practice: expert clinical practice, research, leadership and facilitating learning

8. DMS ACPs/ACCPs must be credentialed to assure their clinical trg. The RCEM and FICM programs include competency sign-off and assessments incorporated via the e-portfolio. This aligns itself with the medical model of EM/CC trainee competencies.

9. Within the DMS, there is currently a range of AP titles in use: Advanced Clinical Practitioner (ACP), Advanced Nurse Practitioner (ANP), Emergency Nurse Practitioner (ENP), Specialist Practitioner (SP), Critical Care Practitioner (CCP), Advanced Pre-Hospital Emergency Care Practitioner (APhecP), Military Nursing Practitioner (MNP), General Practice Nursing Officer (GP Nursing Officer) and Nurse Practitioners (NP). Much like the NHS, these varying terms exacerbate role ambiguity, adding a further layer of complexity for AP development.

Recommendations

10. To promote clarity and consistency, the following terms are recommended for adoption by the DMS:

   a. **Advanced Clinical Practitioner (ACP).** An ACP (EM) is a specialist EM nurse who has obtained an MSc in Advanced Clinical Practice (accredited by HEE) and has successfully credentialed with RCEM. They can work autonomously, delivering a high level of advanced care and decision-making for patients in the firm base and on operations. Advanced-level practice encompasses four domains: clinical practice, education, research, and leadership. However, the role is firmly grounded in direct care provision[1].

   b. **Advanced Critical Care Practitioner (ACCP).** As mentioned above, ACCP work as a specialist CC nurse who has obtained an MSc in Advanced Clinical Practice (accredited by HEE) and has successfully credentialed with FICM. They are responsible for patient care during

admission and are empowered to make high-level clinical decisions to ensure patients receive timely, personal and effective care[5].

c.   **trainee Advanced Clinical Practitioner (tACP) & trainee Advanced Critical Care Practitioner (tACCP).**The tACP/tACCP is a developmental role. tACP/tACCP are working towards becoming a credentialed ACP/ACCP. The role is supervised and linked to competencies that require completion within 3-5 years of commencement of the RCEM or FICM curriculums. The tACP/tACCP focus will be developing autonomous practice and completing the RCEM/FICM program. If competencies are not achieved, they are unable to be recognised as an ACP/ACCP within the DMS. The tACP/tACCP can practice autonomously (either operationally or in the firm base clinical environments), providing there is a supervisor at either Senior Medical Officer or Registrar level who is qualified in their area of speciality.

d.   **Enhanced Nurse (EN).** An enhanced nurse is an Emergency Medicine (EM) or Critical Care (CC) practitioner who is an EM/CC specialist nurse with additional clinical Modules, e.g. minor injuries and illness, or a legacy MSc qualification in AP. However, the Enhanced Nurse has not completed or has not yet commenced the credentialing pathway with RCEM/FICM. Enhanced-level nurses have a variety of job titles and are experienced EM/CC specialist nurses. They undertake work in a specialist area such as urgent care working as a nurse practitioner alongside a multi-disciplinary team. ENs work under supervision and protocols applying to their skills, knowledge, and experience. These nurses will be preparing towards ACP/ACCP. Enhanced practice can be a precursor to ACP/ACCP, or can be a valued workplace role, offering services and patients a consistent level of expertise[6]. The following titles come under the above definition: ANP, ENP, CCP, APhecP, MNP, GP Nursing Officer, SP & NP.

Summary

15.   The lack of standardisation around AP roles within the DMS has impacted working relationships and career progression. Adopting the HEE strategy alongside the RCEM/FICM curriculums mitigates issues associated with role identity, boundaries, and variabilities of standardisation. By defining standard titles within DMS, which are coherent with HEE/NHS, would mitigate confusion and risk.

Sqn Ldr Paxman ARRC
tACP
CAM PhD Research Nurse
Emergency Department & Pre-Hospital Care.

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