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More than lights and sirens : Assessing the impact of a national accreditation scheme from the perspective of change in an evolving profession - Paramedicine

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MORE THAN LIGHTS AND SIRENS: ASSESSING THE IMPACT OF A NATIONAL ACCREDITATION SCHEME FROM THE PERSPECTIVE OF CHANGE IN AN EVOLVING PROFESSION- PARAMEDICINE.

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Glossary of Terms

Accreditation: The formal process of recognising that an education program meets the required standards set by an accrediting body. Within this document, accreditation explicitly refers to the National Registration and Accreditation Scheme (NRAS).

Competencies: Students must acquire these essential abilities during their educational programs to ensure they can perform safely, effectively, and ethically in their healthcare roles. These competencies encompass a range of cognitive, technical, interpersonal, and professional skills.

Competency frameworks: Structured systems that outline the specific competencies required for healthcare professionals to perform effectively. These frameworks provide a clear and organised approach to developing, assessing, and maintaining the skills, knowledge, and behaviours essential for high-quality healthcare practice.

Curriculum: A comprehensive plan that outlines the educational objectives, content, instructional methods, assessment strategies, and learning experiences provided to students. It ensures that students acquire the necessary competencies to perform effectively in their healthcare roles.

Evidence-based medicine: The conscientious, explicit, and judicious use of the best current evidence in making decisions about the care of individual patients, integrating individual clinical expertise with the best available external clinical evidence from systematic research.

Evolving scopes of practice: The continual adaptation and expansion of the roles and responsibilities of healthcare professionals as they respond to new healthcare challenges, technologies, and societal needs.

Paramedic: According to Paramedics Australasia (PA, 2014), a paramedic is a "health professional who provides rapid response, emergency medical assessment, treatment, and care in the out-of-hospital environment" (p. 3).

Paramedicine: A domain of practice and a health profession that specialises across a range of settings, including, but not limited to, emergency and primary care (Williams et al., 2021, p. 3).

Paramedicine education refers to the structured educational process through which individuals are trained to become paramedics, equipping them with the knowledge, skills, and competencies necessary to perform effectively in emergency medical settings.

Professional capabilities: The regulatory and competency frameworks that ensure the quality and safety of healthcare professionals in Australia.

Regulatory frameworks: In healthcare, including paramedicine, regulatory frameworks establish guidelines and standards for the practice, education, and professional conduct of health practitioners. These frameworks are designed to ensure that practitioners provide safe, effective, and ethical care. Ahpra is the national body responsible for regulating health practitioners in Australia, including paramedics.

University education in paramedicine: involves structured academic programs designed to prepare students for professional practice. This education typically includes undergraduate degrees, which combine theoretical knowledge, practical skills, and clinical experience.

Vocational education: Focuses on practical, hands-on training in paramedicine, generally preparing individuals for specific careers in emergency medical services. It is designed to equip individuals with the skills and knowledge necessary for effective performance in paramedic roles and related professions.

Abstract

Introduction/Background: This thesis provides an in-depth analysis of the intricate relationship between curriculum design, accreditation processes, and the evolving landscape of paramedicine in Australia, particularly within the context of the National Registration and Accreditation Scheme (NRAS), which was established in 2018. The research explores the impact of the advent of the NRAS on the development and delivery of paramedicine education, examining its influence on both the academic and professional readiness of paramedic graduates. By contextualising the historical evolution of paramedic practice in Australia, this study examines the current status and challenges facing the profession, with a focus on the regulatory and educational frameworks that support it.

Aim: The primary aim of this study is to investigate how paramedicine courses developed under the Australian Paramedicine National Registration and Accreditation Scheme effectively prepare graduates to meet the dynamic and ever-changing demands of their profession. The research aims to identify the strengths and weaknesses within current educational frameworks, providing insights into how these frameworks can be enhanced better to equip paramedic students for the realities of professional practice.

Methods: Employing a multi-modal methodology, this study engages with various data sources, including academic literature, regulatory documents, and interviews with key stakeholders in the paramedicine field. A comparative analysis with international jurisdictions is also conducted to identify potential areas for improvement and innovation within the Australian context. This methodological approach enables a comprehensive examination of the educational, regulatory, and professional frameworks that underpin paramedicine education in Australia, providing a solid foundation for the study's findings and recommendations.

Findings: The findings suggest that while accreditation processes ensure baseline professional competency, they do not prescribe curriculum content, resulting in varied interpretations and implementation across institutions. This has led to inconsistencies in how key areas—such as primary healthcare, governance, and interprofessional collaboration—are integrated into paramedicine programs. Rather than attributing this solely to a lack of standardisation, the study acknowledges the

broader challenge of balancing regulatory flexibility with the need for consistency in graduate preparedness. International comparisons further highlight how structured, but adaptable curriculum frameworks can support both innovation and coherence in education.

Discussion: The discussion synthesises key findings from an analysis of paramedicine curricula, accreditation frameworks, and evolving models of care. It reveals that while Australian paramedicine education programs demonstrate strong alignment with emergency response and acute care, significant gaps persist in primary healthcare, governance, and community-based care. The study highlights inconsistencies in curriculum integration across universities, reflecting the broader challenge of aligning educational standards with accreditation requirements.

A critical finding is that accreditation frameworks, although essential in ensuring professional competency, do not provide prescriptive curriculum guidance, resulting in variability in program design. The RESPIGHT model analysis revealed disparities in how universities integrate primary healthcare and interprofessional collaboration, underscoring concerns about graduate preparedness for expanded roles in healthcare systems. Additionally, international comparisons suggest that paramedicine education in Australia may benefit from adopting structured curriculum frameworks that strike a balance between regulatory oversight and curricular flexibility.

Conclusions and Recommendations: This study concludes that while accreditation provides an essential foundation for ensuring paramedic competence, variability in curriculum design has contributed to inconsistencies in graduate outcomes, particularly in areas aligned with expanded scopes of practice. It recommends the development of structured curriculum frameworks that align with accreditation standards while maintaining flexibility to respond to local and emerging healthcare needs. Enhanced emphasis on primary healthcare, leadership, and collaboration between education providers, industry, and regulatory bodies will be essential to preparing graduates for future practice.

To address these challenges, this study recommends a structured approach to curriculum development, incorporating standardised frameworks that align with accreditation requirements while allowing flexibility for emerging healthcare trends. Strengthening primary healthcare education, embedding governance and leadership training, and fostering stronger collaboration between universities, accreditation

bodies, and industry stakeholders are critical steps in ensuring paramedic graduates are well-prepared for contemporary practice.

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List of Abbreviations

ACP - Australasian College of Paramedicine

Ahpra - Australian Health Practitioner Regulation Agency

AOTC - Ambulance Officer Training Centres

CAA - Council of Ambulance Authorities

CBT - Competency-based Training

EMS - Emergency Medical System

HCPC - Health and Care Professions Council

HPCA - Health Practitioners Competence Assurance

HPCSA - Health Professions Council of South Africa

IPR - International Paramedic Registry

NAEMT - National Association of Emergency Medical Technicians

NAPA - Network of Paramedic Academics

NHS - National Health Service

NHTSA - National Highway Traffic Safety Administration

NOCP - National Occupational Competency Profile

NRAS - National Registration and Accreditation Scheme

NREMT - National Registry of Emergency Medical Technicians

PA - Paramedics Australasia

PAC – Paramedicine Accreditation Committee

PAC - Paramedic Association of Canada

PBA- Paramedicine Board of Australia

RTO - Registered Training Organisations

TAFE – Technical and Further Education

VET – Vocational Education and Training

Statement of Original Authorship

This thesis contains no material that has been extracted in whole or in part from a thesis that I have submitted towards the award of any other degree or diploma in any other tertiary institution. No other person's work has been used without due acknowledgment in the main text of the thesis. All research procedures reported in the thesis received the approval of the relevant Ethics/Safety Committees (where required).

Signature:

Date: 28th April 2025.

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Chapter 1: Introduction

The landscape of paramedicine in Australia has undergone significant transformation over the past few decades, shifting from an apprenticeship-style, vocational-based training model to a university-led profession that requires formal education. This transition reflects the broader recognition of paramedics as essential healthcare providers who play a critical role in the continuum of care. As the profession has evolved, so has the need for robust educational frameworks that adequately prepare students for the diverse and expanding roles they will encounter in clinical practice.

Chapter One comprises several subsections, each serving a distinct purpose. Section 1.1 contextualises the thesis by establishing the background of paramedicine and the role of paramedics. Section 1.2 justifies the research, while Section 1.3 presents the problem, research aims, and methodological approach. Section **Error! Reference source not found.** outlines the research questions, clarifying the thesis's purpose and scope. Finally, Section 1.5 provides an overview of each chapter, detailing their purpose and content.

1.1 BACKGROUND: PARAMEDICINE AND ITS EVOLUTION

The ideal way to begin a thesis that explores the field of paramedicine is to define what a paramedic is as opposed to paramedicine. Paramedics are clinicians who work in the out-of-hospital (prehospital) setting and provide care to the sick and injured, with transportation to the most appropriate medical facility. Paramedics Australasia's (PA) (2014) description of a paramedic is "a health professional who provides rapid response, emergency medical assessment, treatment, and care in the out-of-hospital environment" (p.3). Paramedicine, as defined by Williams et al. (2021), is "a domain of practice and a health profession that specialises across a range of settings, including, but not limited to, emergency and primary care" (p. 3561). Paramedics are often the first healthcare providers on the scene, responsible for stabilising patients and making critical decisions about their care. The role of the paramedic has expanded beyond traditional emergency response to include aspects of primary care, mental health support, and public health, reflecting the community's evolving healthcare needs.

Historically viewed as first responders to emergencies, paramedics now provide care across diverse settings, reflecting a shift in healthcare delivery that meets the complex needs of modern societies. The COVID-19 pandemic highlighted this shift, with paramedics playing a critical role in community-based care, mainly through community paramedicine programs, which delivered essential healthcare services to patients in their homes and local communities (Batt et al., 2022; Drennan et al., 2021). This shift demonstrates the profession's capacity to adapt to changing healthcare landscapes, providing care that extends beyond traditional emergency scenarios.

In Australia, the paramedicine profession is distinguished by a regulatory framework that oversees the endorsement of paramedics, ensuring they maintain current practice and demonstrate competence. Unlike some healthcare professions with strictly defined national legislation guiding practice, the roles of paramedics are shaped by individual competencies, employer requirements, and professional standards. The introduction of national regulation in 2018 through the National Registration and Accreditation Scheme (NRAS) marked a pivotal moment for the profession, ensuring uniformity in practice standards across all states and territories (Ahpra, 2021). The establishment of the Paramedicine Board of Australia (PBA) further enhanced the profession's credibility by implementing stringent requirements for maintaining recency of practice and ongoing competency. These measures have significantly bolstered public confidence in paramedics, who are consistently ranked among the most trusted professionals in Australia, as highlighted by Reader's Digest's annual Most Trusted Profession poll (Reader's Digest, 2022).

Education within paramedicine has also evolved considerably to meet the profession's expanding scope and complexity. Training initially occurred within hospitals before transitioning to vocational education settings in the 1960s. The 1990s marked a transformative period in Australian paramedic education as universities increasingly assumed the responsibility of training paramedics. The transition of paramedicine education from vocational training to university-based programs in Australia began in the mid-1990s and progressed at varying rates across states. Charles Sturt University is widely recognised as having established the first paramedic degree program in Australia, launching its undergraduate program in 1994 (Lord, 2003). In 1995, Victoria University introduced a degree conversion program and Flinders University introduced a pre-employment degree in partnership with the South

Australian Ambulance Service in 1998, further supporting the shift toward university education for paramedics (Brooks et al., 2018).

Today, paramedicine education is primarily delivered through bachelor's degree programs, which provide a comprehensive foundation in clinical knowledge, critical thinking, and leadership. This academic shift has been instrumental in preparing paramedics to meet the growing clinical demands of contemporary healthcare, enabling them to manage complex patient needs and contribute to multidisciplinary care teams (Brooks et al., 2018). The evolution of paramedicine education underscores the profession's commitment to excellence and its dedication to delivering high-quality care across diverse healthcare environments.

This expanding scope, combined with robust regulatory and educational frameworks, positions paramedicine as a dynamic and essential component of Australia's healthcare system. The profession's evolution reflects broader societal and healthcare trends, ensuring that paramedics are well-equipped to meet the present and future challenges of healthcare delivery.

1.2 RESEARCH JUSTIFICATION

My professional and academic journey over the past 25 years has significantly shaped the development and interpretation of this thesis. I began my career as a student paramedic, progressing through various clinical roles including Intensive Care Paramedic, Flight Paramedic, Educator, and Clinical Support Officer. These roles provided me with a rich understanding of frontline paramedic practice and the evolving complexities of prehospital care.

My educational background reflects the transition of paramedicine in Australia from vocational training to higher education. I first completed an Associate Diploma of Applied Science (Ambulance) in 1991, followed by an Advanced Diploma of Health Science (Advanced Prehospital Care) in 1999. I later broadened my clinical scope with a Bachelor of Health (Nursing) in 1995. In 2012, I completed a Master of Health Science (Research) by publication, where my work focused on paramedics' attitudes toward morphine administration, applying the Theory of Planned Behaviour.

My academic career formally began with a role at Queensland University of Technology (QUT) as Principal Educator and developer of the Intensive Care Paramedic Program. In 2010, I moved to CQUniversity, where I led the development

of the Bachelor of Paramedic Science and subsequently served as Discipline Lead and in various senior management roles focused on education quality, curriculum development, and educator capability building. These experiences have given me a deep appreciation for the interplay between curriculum, clinical practice, and professional identity formation in paramedicine.

This thesis is grounded in an ontological perspective shaped by this dual identity—as a clinician and as an academic. My interpretation of data, development of the Paramedicine Healthcare Framework, and the overall approach to curriculum reform are all informed by this lived experience. While striving for academic rigour and critical distance, I also acknowledge the insider perspective I bring, which has helped frame the relevance, feasibility, and potential impact of the proposed educational model on the future of paramedicine in Australia.

High-quality paramedicine curricula are crucial for advancing the profession and ensuring that graduates are well-prepared to meet the demands of their roles. While my perspective is informed by professional experience, evidence from the literature also underscores the need for improvements in paramedicine education. A 2015 study highlighted the absence of published research directly addressing paramedic pre-employment students' concerns regarding their preparedness for employment (Waxman & Williams, 2015). These issues have been more extensively explored within nursing education, where curriculum reform has been a key strategy to align educational preparation with the realities of clinical practice. Waxman and Williams emphasised the urgency of addressing similar concerns in paramedicine education. More recently, Peasey et al. (2024) examined paramedicine curricula across five Australian states and universities, identifying substantial variation in the inclusion of paediatric content. While they reported a national median of 0% for standalone paediatric units and a median inclusion of 10% of paediatric content in relevant subjects, they also found that 32% of units across the programs referenced paediatrics in some form. These findings suggest that paediatric content may be integrated across units rather than delivered as dedicated modules. However, a critical need remains to evaluate how comprehensively and consistently such content is embedded across programs to ensure graduate preparedness for diverse clinical scenarios. These findings further support the need for systematic reform to ensure that curricula adequately prepare students for the diverse and evolving demands of paramedicine

practice. My research aims to contribute to this critical area by investigating how contemporary paramedicine curricula can be enhanced to address these deficiencies and support the development of competent, practice-ready graduates. However, I also observed that this education increasingly seemed disconnected from the clinical setting. These observations fuelled my interest in investigating what elements should be incorporated into the design of undergraduate paramedicine curricula and how these programs should be delivered to improve the quality of paramedic graduates and enhance patient outcomes.

The transformation of paramedicine from a vocational-based training model to a university-led profession reflects a broader recognition of paramedics as integral to the healthcare continuum. Despite the significant advancements in paramedicine education over the past few decades and recent regulations, several gaps in the literature remain that warrant further investigation to enhance the quality and relevance of paramedic education and practice. This thesis seeks to address these gaps.

The shift in paramedics' roles from emergency response to encompassing primary care, mental health support, and public health highlights an evolving scope of practice not fully captured by current educational frameworks. Although recent updates to the Accreditation Standards for Paramedicine Education Programs (Ahpra, 2020) have sought to address evolving professional demands, the limited available literature suggests that these standards may still fall short in thoroughly preparing paramedics for the increasingly complex requirements of their roles. While research in this area remains sparse, existing studies provide valuable insights that support this claim. For example, a comparative study of Australian and UK paramedic education highlights challenges, such as Australian paramedic students spending fewer hours on clinical practicum than their UK counterparts. Newly graduated paramedics often require an internship period through the UK Newly Qualified Paramedic (NQP) programme to develop critical competencies, including organisational operations and clinical decision-making (Reid et al., 2019).

The NQP period is a consolidation programme rather than a simple internship, asserting it systematically supports the transition to autonomous practice by enabling reflective application of academic learning in real-world settings (Copson et al., 2024). The programme’s intent is to support newly registered paramedics in becoming

confident, independent clinicians through mentoring, regular portfolio reviews, and engagement with experienced practitioners.

Furthermore, an international case study on the development of the paramedic profession in the UK reveals a mismatch between the advanced capabilities of paramedics and the professional opportunities available to them within ambulance services (Newton et al., 2020). This disparity has been attributed to a lag in reform and modernisation in healthcare services, which have failed to keep pace with the rapid evolution of the paramedic profession. Consequently, paramedics' ability to fully utilise their skills has been hampered and combined with organisational stressors and occupational demands, contributing to staff dissatisfaction and high turnover rates. These findings underscore the broader need for systematic reform in healthcare service models and educational standards to better align paramedic preparation with the complexities and demands of modern paramedicine practice.

This misalignment has been linked to slow organisational reform and outdated healthcare models that have failed to evolve alongside the expanding role and expertise of paramedics. As a result, many paramedics in the UK have experienced significant frustration, with limited scope to apply their full skill set, leading to professional dissatisfaction and high turnover. This serves as a cautionary tale for the Australian system: if organisational issues are not addressed, if educational programs are not aligned with real-world scope, and if the profession is not empowered to operate at its full potential, Australia risks facing similar workforce attrition. These findings reinforce the urgent need for systemic reform that better integrates education, regulation, and service delivery to support the sustainability and growth of the paramedicine profession.

The introduction of the NRAS and the establishment of the Paramedicine Accreditation Committee (PAC) marked a significant shift in the regulation of paramedicine in Australia. However, the impact of these regulatory changes on paramedic education and practice remains underexplored. While the Professional Capabilities and Accreditation Standards set national benchmarks for paramedic education, there is limited research on how these standards have influenced educational outcomes and practice competencies in the field. Understanding the practical implications of these regulatory changes is crucial for ensuring that paramedics are adequately prepared to meet contemporary and future healthcare needs.

A comprehensive understanding of the regulatory frameworks governing paramedicine across different geographical regions is lacking. Although a growing body of literature exists on the evolution of paramedic practice in Australia, there is a limited comparative analysis of how regulatory environments in different states and internationally influence paramedic education and practice. Exploring these differences can provide valuable insights into best practices and areas that need improvement, contributing to the development of more effective regulations and educational frameworks.

1.3 RESEARCH PROBLEM, AIMS, AND METHODOLOGICAL APPROACH

The primary aim of this study is to evaluate the current state of paramedicine education in Australia, particularly in the context of national accreditation standards. The study seeks to determine whether these standards are sufficient to prepare graduates for the expanding and increasingly complex scope of practice expected of paramedics. Key research questions address how curricula are designed, how they align with accreditation standards, and what improvements might be necessary to enhance the readiness of paramedic graduates.

To achieve this aim, the following research objectives have been developed:

1. Explore the relationship between accreditation standards and curriculum design in paramedicine education programs, particularly focusing on how programs accredited under the Australian Paramedicine National Registration and Accreditation Scheme reflect and prepare graduates for the current and evolving scope of practice in paramedicine.

2. Examine the perspectives of key stakeholders, including educators, accrediting bodies, and graduates, on the adequacy of current curricula in preparing paramedics for professional practice and identify areas where improvements may be necessary.

3. Identify gaps in the current educational framework through a detailed analysis of accreditation documentation, curricula, and stakeholder interviews, focusing on the alignment (or misalignment) between curriculum content and the evolving scope of paramedic practice.

4. Provide recommendations for future curriculum development that respond to the identified gaps and align with the needs of contemporary paramedic practice in Australia.

This study employs a multi-modal approach to evaluate the alignment between paramedicine education curricula and accreditation standards in Australia, focusing on preparing graduates for the evolving scope of practice. Grounded in a constructivist philosophical framework, as described by Creswell and Creswell (2018), this study seeks to understand how multiple stakeholders perceive and experience paramedicine education, accreditation, and scope of practice. Critical theory informs the conceptual framework, while the contextual framework situates these elements within the broader professional landscape.

A multi-modal methodology is particularly suited to this study, as it enables a detailed exploration of how curricula align with professional standards and the perspectives of those involved in paramedicine education and accreditation (Sandelowski, 2000). Rather than developing new theoretical models, this study aims to provide a comprehensive and nuanced description of the alignment between educational frameworks and professional practice requirements through qualitative descriptive analysis. This approach ensures a holistic understanding of the interplay between education, accreditation, and the evolving demands of paramedicine.

In this study, educational frameworks refer to structured classification systems that organise knowledge, skills, and competencies to guide curriculum development, teaching strategies, and assessments. Specifically, for this thesis, a framework provides a structured approach to categorising learning outcomes and ensuring alignment with accreditation requirements. These frameworks help structure paramedicine education to meet professional standards and evolving industry expectations.

1.4 RESEARCH QUESTIONS, PURPOSE AND SCOPE

This study is driven by overarching research objectives and questions designed to critically assess the evolution, current state, and future trajectory of paramedic practice and education in Australia. Through a multi-faceted exploration of historical, regulatory, educational, and international dimensions, the research aims to provide comprehensive insights into how Australian paramedic education prepares graduates

to meet the dynamic needs of the profession. One of the key aims of this study is to develop a framework for paramedicine based on the findings, which will be discussed in detail later in the thesis.

1.4.1 Research Question

At the core of this study is the primary research question:

How does the Australian Paramedicine National Registration and Accreditation Scheme prepare paramedic graduates for the evolving scope of paramedic practice?

This central question is supported by three sub-questions designed to unpack critical dimensions of paramedic education and practice:

Question One: What has been the historical evolution of paramedicine in Australasia?

This question seeks to chart the trajectory of paramedic practice in the region, providing a contextual backdrop that enhances understanding of current regulatory and educational frameworks.

Question Two: What key trends are currently influencing the clinical practice of paramedicine in Australasia?

This question examines contemporary factors that shape paramedic practice, including technological advancements, changing healthcare demands, and evolving clinical roles, thereby enabling a nuanced analysis of the profession's future directions.

Question Three: In what ways does higher education contribute to meeting the evolving professional requirements of paramedicine?

This question explores the role of higher education institutions in equipping paramedic graduates with the competencies necessary to navigate current and future challenges. In particular, it interrogates the tension between producing graduates tailored to specific roles within ambulance services and fostering broader, profession-wide capabilities.

Study Design Overview

Following the articulation of the research questions, the remainder of this chapter outlines the phased design of the study and its implementation. This multi-modal

methodology provided a robust framework for evaluating the alignment between paramedicine curricula and accreditation standards by combining systematic reviews, comparative analysis, thematic analysis, meta-synthesis, discourse analysis, and a Delphi study. Each phase was designed to build upon the previous one, ensuring a comprehensive and evidence-based evaluation that informs recommendations for future curriculum development.

The first phase involved conducting narrative and systematic reviews to critically assess existing literature on paramedicine education and the role of accreditation standards. This phase aimed to identify gaps in current educational frameworks and highlight areas where curricula may need to adapt to better meet the demands of paramedic practice. This phase provided a theoretical foundation for the subsequent empirical research, ensuring the study was grounded in current knowledge. Systematic reviews ensured a comprehensive and unbiased evaluation of the existing literature, while narrative reviews facilitated a broader synthesis of concepts and frameworks relevant to the research questions (Shaheen et al., 2023).

The second phase employed a descriptive-comparative approach, which included comparing paramedicine education programs within Australia to those in other jurisdictions, using Modified Brady's model and an extended Comparative Education model. This phase aimed to evaluate how different educational systems prepare paramedics for practice and to identify best practices from other regions that could inform curriculum development in Australia. The descriptive-comparative approach is appropriate for identifying how curricula differ across contexts, which helps understand the alignment (or lack thereof) between educational content and practice requirements (Doyle et al., 2020).

Thirdly, a deductive thematic analysis was conducted using data collected from key stakeholders, including educators, accrediting bodies, and graduates. Semi-structured interviews were used to elicit their perspectives on the adequacy of current paramedicine curricula in preparing graduates for the evolving scope of practice. The themes derived from this analysis were mapped against the accreditation standards to assess alignment. Deductive thematic analysis enabled the exploration of specific curriculum design and accreditation themes, ensuring the study remained focused on answering the key research questions (Naeem et al., 2023).

In phase four, a sequential meta-synthesis approach was employed to integrate the findings from the descriptive-comparative and thematic analyses. This meta-synthesis gave a comprehensive understanding of how well current accreditation standards and curricula prepare graduates for paramedic practice. Additionally, discourse analysis was employed to examine the language used in accreditation documentation and curricula in order to better understand how the evolving scope of practice is framed. The combination of meta-synthesis and discourse analysis facilitated a deeper examination of the structural and content aspects of accreditation and curriculum documents, offering insights into potential misalignments and areas for improvement.

Finally, a Delphi study was conducted with a panel of experts to validate the findings and develop a consensus on recommendations for future curriculum development. The panel included educators, accreditation representatives, and practising paramedics. The Delphi method facilitated the refinement of recommendations based on expert feedback through a series of iterative rounds. The Delphi method is ideal for achieving consensus among experts, ensuring that the curriculum improvement recommendations are practical and grounded in expert knowledge.

The Delphi study findings provide a robust, consensus-driven foundation for advancing the development of paramedic curricula. This approach complements the historical and contextual analysis of paramedic practice in Australia, which examines the evolution of educational, regulatory, and professional frameworks. Together, these insights provide a comprehensive foundation for understanding current challenges and informing future educational strategies that align with the profession's evolving role in healthcare.

The first objective aims to trace the historical development and current state of paramedic practice in Australia, focusing on the educational, regulatory, and professional frameworks that underpin it. This foundational analysis provides essential context for understanding the profession's evolution and positioning within the broader healthcare landscape.

The second objective aims to assess the Australian paramedic regulatory and educational framework by comparing it to international models. This comparative

analysis will elucidate both strengths and weaknesses, offering critical insights into how Australia aligns with or diverges from global standards in paramedicine.

The third objective focuses on exploring the theoretical underpinnings of current paramedic education programs. By examining how these frameworks are embedded in curricula, this objective ensures that programs are assessed not only for compliance with accreditation standards but also for their alignment with contemporary professional expectations.

The final objective is to develop a theoretical framework that informs future policy, practice, and educational strategies in paramedicine. By identifying existing gaps and emerging opportunities, this forward-looking analysis will contribute to shaping a responsive and adaptive paramedic education system capable of addressing evolving healthcare needs.

This study critically evaluates how accreditation frameworks guide curriculum design and whether they effectively prepare graduates for the multifaceted demands of modern paramedic practice. By addressing historical, contemporary, and future-oriented aspects, the study seeks to identify areas for improvement in educational practices and offer evidence-based recommendations for curriculum enhancement. Ultimately, this study aspires to inform policy development and educational reforms that align paramedic training with the realities of Australia's increasingly complex and dynamic healthcare environment.

1.4.2 Significance of the Research

This study is significant because it addresses a critical gap in the literature regarding the alignment of paramedic education with professional practice. As the demands on paramedics continue to grow, educational programs must evolve in tandem to ensure that graduates are fully equipped to face the challenges they will encounter in the field. The findings of this study will have implications for curriculum design, accreditation standards, and the broader regulatory framework governing paramedicine in Australia.

The data collected will be used to describe and evaluate the current educational frameworks in place based on actual practices and stakeholder feedback rather than generating new theoretical constructs. While Grounded Theory is valuable for theory generation, my study aims to provide practical, evidence-based recommendations for

improving the design of paramedicine curricula, which is better served by a descriptive rather than theory-driven approach. This decision aligns with the practical outcomes desired from the research, which focus on curriculum improvement rather than the development of a new theoretical model.

1.4.3 Ethical Considerations

The National Health and Medical Research Council (NHMRC) promotes the values and principles of educational research, which identify the relationship between researchers and research participants as the foundation on which human research is conducted. The values set out by the NHMRC – respect for human beings, research merit and integrity, justice, and beneficence – help shape the relationship between the participants and researchers as one of trust, mutual responsibility, and ethical equality. (NHMRC, 2018). Any research must adhere to ethical standards and guidelines that prioritise the safety of both the researcher and the participants (NHMRC, 2018). The researcher is responsible to the study participants for ensuring that all participants give voluntary informed consent and are fully aware that they have the right to withdraw.

The study protocol used in my study was approved by the Central Queensland University Human Research Ethics Committee (Reference H17/07-142). Before the study's commencement and data collection, an introductory email was sent to the Network of Australasian Paramedic Academics (NAPA). The email (Appendix One) informed participants that I was investigating the curriculum and design of Bachelor of Paramedic Science (BPSc) or equivalent degree programs as part of my PhD studies. Specifically, the study aimed to provide an overview of the purpose, learning about what paramedic academics believe are the best curriculum components that help graduates acquire the skills, theory, and knowledge necessary to be job-capable and prepared for rapid practice changes. The participants were informed that the research was voluntary and that all information collected would be kept confidential. The participants were provided with a link to the survey, which contained open-ended questions where they could type in their responses. Once the questionnaire was returned, it was not possible to withdraw the study's data, as all questionnaires had been de-identified. The participant information sheet (Appendix Two) and the instruction sheet (Appendix Three) were attached to the email. These documents contained information about the study and the methodology used in the Delphi study.

1.5 THESIS OUTLINE

This PhD thesis is structured as a thesis by publication and comprises eleven chapters, organised to provide a coherent narrative that integrates six peer-reviewed publications. The thesis explores the evolving landscape of paramedicine education, practice, and regulation in Australia and comparable international contexts. This thesis is structured as follows: Chapter Two provides a comprehensive narrative review of the literature on paramedicine education and the regulatory frameworks governing the profession. Chapter Two also incorporates and expands upon the content of the first published paper, which is presented in full within this chapter. This paper is a conceptual discussion examining vocational and university pathways in paramedicine education and their relationship to professionalism. Chapter Three details the study's methodology and methods used in this study. Chapter Four presents the study's findings, including a brief analysis of the five published papers. However, the core of the thesis is built around five key publications:

- Publication Two (Chapter Five) – a comparative analysis of paramedicine regulatory frameworks across Anglosphere nations.
- Publication Three (Chapter Six) – a literature review on paramedic capabilities and competency frameworks.
- Publication Four (Chapter Seven) - includes applying the RESPIGHT model to explore paramedicine models of care through macro-level analysis.
- Publication Five (Chapter Eight) - presents which maps the evolution of paramedicine education and synthesises trends and recommendations for primary healthcare readiness.
- Publication Six (Chapter Nine) - includes discussing curriculum development frameworks in Australian higher education as they pertain to paramedicine.

The thesis then revisits the discussion and consolidates insights:

Chapter Ten delivers a broader Discussion integrating the various strands of the study and publications. Chapter Eleven concludes the thesis by drawing together key findings, contributions to knowledge, policy implications, and directions for future research.

This structure allows for both the presentation of distinct research outputs and a unified, overarching scholarly argument about paramedicine education and practice's transformation and future direction .

Figure 1.1 Structure of the thesis

Chapter Two presents a comprehensive narrative review that examines the interconnected relationship between paramedicine curricula, graduate competencies, and professional practice. This chapter emphasises the need for greater alignment between undergraduate paramedicine programs and national accreditation standards—an area that remains under-researched, particularly in the Australian context. My first published article within this body of research provides a detailed examination of paramedicine education, tracing the evolution of curriculum development from past to present while considering future directions to ensure its relevance to contemporary practice. The chapter also emphasises the crucial need for more peer-reviewed research on paramedicine curricula in Australia and globally. Given that national paramedicine accreditation in Australia is a relatively recent development, the exploration of curriculum design in paramedicine education is still in its formative stages, warranting further investigation.

Chapter Three outlines the study's framework, detailing the study's design, methodology, and data collection tools. This chapter elaborates on the qualitative approach to examine how the Australian National Paramedicine Accreditation Scheme can effectively prepare graduates for the evolving scope of paramedic practice. It explains the methods used to collect and analyse data, including the combination of systematic reviews, comparative analysis, thematic analysis, and consensus methods, to ensure a comprehensive evaluation of paramedicine curricula.

Chapters Four to Nine are structured around five journal articles, each offering a thorough analysis of the theoretical literature on the link between curricula, graduate competencies, and professional practice. The first article presents the data sources that informed the implementation of the consensus method, including a comparative education model that analyses international paramedic education systems and their applicability to Australian contexts. The second article examines the relationship

between paramedicine competencies, scope of practice, and accreditation, with a focus on aligning curricula with the diverse demands of the profession.

The third article discusses the evolving healthcare landscape and its implications for paramedicine education. It uses the RESPIGHT model of care to assess students' preparedness for the broad scope of paramedic practice across Australian universities. The fourth article summarises the findings from the consensus method, presenting proposed curriculum improvements for paramedicine education. The fifth article examines the necessity for well-defined frameworks in paramedicine curriculum development in Australia and New Zealand, drawing on a discourse analysis and systematic review to identify suitable frameworks for future curriculum design.

Chapter Ten critically interprets the study's findings in relation to the study's objectives and the broader literature. It evaluates the research outcomes, addresses any limitations, and provides key insights into how these findings contribute to the ongoing development of paramedicine education.

Chapter Eleven concludes the thesis by offering recommendations for future paramedicine curriculum and practice development. It summarises the study's contributions, highlights its implications for paramedic education, and suggests areas for further investigation.

This thesis now returns to the beginning to provide context for the research journey. Chapter One introduced the study by outlining the motivation and background, identifying a significant gap in the literature concerning paramedicine education and accreditation. Building on this, Chapter Two explores the context in greater depth, integrating the first published paper and setting the foundation for the subsequent publications that form the core of this thesis.

Chapter 2: Background and Context

2.1 INTRODUCTION TO THE CHAPTER

Chapter Two provides a comprehensive narrative review of the literature relevant to paramedicine in Australia, identifying key developments, existing knowledge, and gaps that this research seeks to address. The chapter begins with an introduction and historical background of paramedicine in Australia, establishing the context for the study. It then critically examines three key areas: prehospital care in Australia, the preparedness of paramedic education for the evolving scope of practice, and the accreditation of paramedicine (Section. 2.2). Each area evaluates the current literature, highlighting gaps in understanding, inconsistencies, and areas requiring further exploration.

Finally, the chapter concludes by introducing the first published paper (Section. 2.3), *"Vocational and University Paramedicine Education – Implications for Professionalism: A Conceptual Discussion," further contextualises* the research within the broader discourse on paramedic education and professionalisation.

This first published paper of this thesis discusses the evolution of paramedic education in Australia, which has seen significant advancements through the establishment of higher education programs and the introduction of accreditation standards, thereby considerably enhancing paramedic training and professional practice. The transition to Paramedicine Board of Australia (PBA) accreditation standards has played a pivotal role in improving patient care and safety.

Despite these advancements, ongoing concerns remain regarding the dual accreditation of vocational diplomas and university degrees. The Paramedicine Board of Australia recognises only one specific Vocational Education and Training (VET) paramedic diploma as a valid pathway to Ahpra registration. This raises questions about the broader recognition of other vocational qualifications and their role in the paramedic profession.

This article offers a comparative analysis of the vocational and university pathways, emphasising the need for a balanced approach when considering the future of paramedicine education. Recognising the unique strengths of both pathways while

addressing their respective limitations is essential to fostering a well-rounded and effective paramedic workforce in Australia.

Undertaking a comprehensive narrative review within a Doctoral thesis identifies unexplored areas of research (Chigbu et al., 2023). It can also help provide an overview of areas where the research is disparate (Snyder, 2019). Literature reviews, such as those undertaken in this thesis, are essential for qualitative research as they identify what others have done and said and develop links between specific topics (Creswell & Poth, 2018). Reviewing the literature facilitates the identification of issues and questions related to how the Australian Paramedicine National Registration and Accreditation System (NRAS) prepares paramedic graduates for the evolving scope of practice in paramedicine. To further address the research question, there is a reference to the information concerning epistemology[1] (development of knowledge) and ontology[2] (multiple curriculum realities). The effects of ontology as the focal point for curriculum development in higher education involve general observations about the curriculum, its development, and the relationship between curriculum experiences and curriculum development.

This study's investigation into the epistemological and ontological dimensions is a critical foundation for understanding the complexities of paramedicine practice and education. Epistemologically, the study seeks to understand how knowledge about paramedicine practice is acquired, justified, and disseminated within educational, regulatory, and professional contexts. This entails a comprehensive exploration of the historical development and current status of paramedic practice in Australia, as well as a comparative evaluation with other jurisdictions. Methodologically, the study adopts a qualitative approach to capture stakeholders' subjective experiences and interpretations, aligning with an epistemological stance that values diverse perspectives. Ontologically, the study acknowledges the existence of multiple realities within the field of paramedic practice, recognising that educational and professional frameworks are socially constructed and influenced by power dynamics. Moreover, the study embraces a social constructivist perspective, viewing reality as co-

[1] Epistemology is derived from the Greek word for knowledge and refers to the theory of knowledge, or how one forms their view of the world (Blackburn, 2008).
[2] Ontology is the study of beliefs about the nature of reality and being Bunniss, S., & Kelly, D. R. (2010). Research paradigms in medical education research. *Medical Education*, *44*(4), 358-366. https://doi.org/10.1111/j.1365-2923.2009.03611.x .

constructed through shared meanings and interpretations. This ontological stance underpins the critical research paradigm employed in the study, emphasising the need to critically analyse the ideological underpinnings and power dynamics inherent in paramedic education and practice frameworks.

The design of undergraduate paramedic curricula within the framework of national accreditation processes remains underexplored in existing literature. This thesis initially aimed to conduct a systematic review of the influence of accreditation on the scope of practice of paramedics and higher education curricula. However, an initial exploration revealed a lack of sufficient peer-reviewed literature on the topic in terms of quantity and quality. To address this gap, the thesis draws heavily on grey literature, particularly in the fields of paramedicine and paramedic accreditation. Grey literature encompasses non-peer-reviewed materials such as government reports, policy documents, and industry publications (Haddaway et al., 2015). This approach was necessary to provide an overview of the historical context, processes, and outcomes associated with accreditation and curriculum design. By integrating these sources, the thesis offers valuable insights into areas where peer-reviewed evidence is currently limited.

2.2 PREHOSPITAL CARE IN AUSTRALIA

The history of healthcare delivery by ambulance personnel spans over 100 years. This evolution has seen the service range from merely a taxi for the sick and injured to the hospital to a sophisticated emergency medical system. This evolution has paved the way for the service that communities recognise and enjoy today.

2.2.1 Historical Context and Background

Ambulance service delivery of healthcare dates back to the 1890s; however, the care primarily focused on transporting patients to the hospital rather than managing them with clinical interventions at the scene (Moritz, 2018). Ambulance services primarily recruited staff with trade-based skills, favouring individuals with first-aid certification and mechanical expertise. The emphasis was on practical abilities such as driving and repairing ambulances rather than on formal medical training or professional patient care. The standard of care for treating these patients was, realistically, at the level of basic first aid compared to the treatment routinely given today, with those working for ambulance services referred to as ambulance drivers or

ambulance officers (Elks, 2005). A first-aid certificate, driver's license, and mechanical ability were often the only requirements needed to become an ambulance driver, the precursor to the modern-day paramedic (Davis, 2017). It is easy to see why the modern-day paramedic was often referred to as an 'ambulance driver' in earlier times. Consequently, education initially played no role in the scope of practice of paramedics.

As the following sections highlight, paramedics have a relatively short history in Australia compared to ambulance drivers or stretcher-bearers. This brief history has seen ambulance brigades amalgamate into ambulance services, vocational qualifications for ambulance officers through to degree programs and accreditation of paramedic programs through the Council of Ambulance Authorities (CAA) with the support of the professional body (Paramedics Australasia, 2016). The process of professionalisation and regulation has been advanced through the establishment of the Paramedicine Board of Australia, which operates under the regulatory oversight of the Australian Health Practitioners Regulation Agency (AHPRA) (Paramedicine Board of Australia, 2023). Different roles have been developed, accompanied by increasing levels of clinical autonomy and changes in educational approaches associated with the various levels of autonomy (Paramedics Australasia, 2016).

The Council of Ambulance Authorities (CAA) was formed in 1962 as the Association of Ambulance Officers and became the national representative body for developing ambulance education standards in 2002 (Grantham, 2004). The CAA, supported by the professional body Paramedics Australasia, has established national competency standards for paramedics based on the professional standards developed by the College of Paramedics, as published by the Health and Care Professions Council (HCPC) in 2014. Regulatory frameworks, such as accreditation, support students in conceptualising what a profession entails and the values of being a professional in the professional world (Bogossian & Craven, 2020). The development of the CAA accreditation system highlights its significance in shaping paramedic education and practice in Australia (Walker, 2009).

The title "paramedic" has evolved since the late 1980s, when the standard reference to a paramedic in most states and territories of Australia was "ambulance officer." In the late 1990s, paramedics were recognised as a separate career from ambulance officers, requiring specialised education (O'Brien et al., 2014). Before

2018, the term "paramedic" was not protected by legislation, so virtually any person providing prehospital care could call themselves a Paramedic. Paramedicine had not achieved formal professional status through national registration. However, a rapid and robust movement towards the professionalisation of paramedicine, with paramedic training entering university settings, occurred.

Since late 2018, paramedicine has become regulated under the National Registration and Accreditation Scheme (National Scheme) through the Australian Health Practitioner Regulation Agency (Ahpra). The title paramedic is relatively recent, and this title given to a member of an ambulance service varies across Australia depending on the scope of practice and the person's clinical experience (Ahpra, 2016).

The title paramedic became a protected title under the Health Practitioner Regulation National Law Act (National Law) in December 2018. As a nationally regulated profession under Ahpra, the title paramedic now assures the public that a paramedic is suitably trained and qualified to practice (Paramedicine Board of Australia, 2023). While paramedic is a protected title under the National Scheme, it ensures the community that a paramedic is well-educated and qualified to provide care.

Each ambulance authority has titles for its staff based on the level of care they can provide, but no standard nomenclature is used across Australasia or internationally. In Australia, various terms are used; however, in most cases, there is a similarity between terms for ambulance personnel with similar skill sets.

Paramedics Australasia (2014, p. 3) described a paramedic as "health professionals who provide a rapid response, emergency medical assessment, treatment, and care in the out-of-hospital environment." Paramedics are clinicians who work in the out-of-hospital environment and are predominantly autonomous and independent in managing patients. They are accountable for managing patients needing urgent medical, surgical, and trauma care. However, the term Paramedicine extends beyond the traditional role of paramedics in emergency response. As defined by Williams et al. (2021), the broader definition of paramedicine reflects the evolving scope of the field, which now encompasses various healthcare settings, including primary care, community health, and emergency response.

While this study primarily focuses on paramedic practice within Jurisdictional Ambulance Services (JAS), it is important to acknowledge the growing presence and

significance of non-JAS and private sector roles within the broader paramedicine landscape. Although JAS remains the predominant employer of new graduates and continues to shape the structure and expectations of Ahpra-accredited programs, paramedicine is increasingly practiced in a variety of settings, including private, industrial, event, and community-based services. These alternative contexts are playing an expanding role in healthcare delivery and may require different competencies, supervision models, and educational preparation. As such, while this research reflects current dominant employment patterns, it recognises that future workforce and curriculum developments should also consider the diverse and evolving scope of paramedic practice beyond the traditional JAS setting.

In Australia, the paramedicine profession is distinguished by a regulatory framework that ensures the continued competence of paramedics. This framework includes the endorsement of paramedics through registration, ensuring that practitioners maintain current practice and demonstrate ongoing competency. Such regulatory oversight is essential for ensuring that paramedics deliver high-quality care across the expanding scope of their practice, from emergency care to primary healthcare settings.

2.2.2 Models of Care

The goals and key performance indicators of any health authority, encompassing general practitioners, nursing, allied health, emergency medicine, and paramedics, are to reduce pain, suffering, morbidity, and mortality. These objectives are supported by most Ambulance Service's mission statements that, in essence, discuss providing appropriate quality care to the community and are recognised as being achieved through the efficient delivery of high-quality prehospital patient care and specialised patient transport services (ACT Emergency Services Agency, 2016; Ambulance Service New South Wales 2019; Queensland Ambulance Service, 2024; St Johns Ambulance Northern Territory, 2016; St Johns Ambulance Western Australia, 2016). There is a global approach to implementing the most effective emergency medical systems to achieve the aforementioned goals and objectives. However, there are varied approaches to this strategy.

An emergency medical system (EMS) is recognised as a comprehensive system. Timely and appropriate health services to patients suffering acute or chronic illness or

severe injury aim to deliver appropriate treatment and the patient to a suitable facility at the proper time via the appropriate means (Mehmood et al., 2018). Some systems focus on delivering the best prehospital care based on best practices and evidence-based medicine. In contrast, other countries focus on the most efficient and quickest way to transport patients to hospitals rather than on prehospital treatment (Al-Shaqsi, 2010).

Whether a management model or a rapid transport model, there is no standardised approach to paramedicine worldwide, with countries working off their protocols and structures. However, what is consistent is that Ambulance Services can be incorporated into specific EMS models. While some prehospital care models centre on basic life support, other organisations deliver advanced life support, critical care, or the newly emerging primary healthcare. However, the most recognised models are the Anglo-American and Franco-German models, with other paradigms worldwide today being offshoots of either of these models (Al-Shaqsi, 2010).

Anglo-American Model

The Anglo-American model, often described as a "scoop and run" approach, prioritises rapid patient transport to a hospital over extensive on-scene management (Al-Shaqsi, 2010). This model, synonymous with paramedicine, involves emergency medical technicians (EMTs) or paramedics—depending on the country—providing essential pre-hospital care before swiftly transporting patients to a hospital for comprehensive treatment. In this system, most diagnostic tests and advanced treatment regimens are conducted in the hospital's Emergency Department, where medical physicians are primarily based (Al-Shaqsi, 2010). Countries widely adopting the Anglo-American model include the United States, Costa Rica, Hong Kong, Iceland, Ireland, Israel, Malaysia, the Netherlands, Nicaragua, the Philippines, Poland, Singapore, South Korea, Taiwan, and Turkey. Contrary to assumptions, EMS technicians and paramedics in these countries typically undergo formal education, such as structured certification programs, diplomas, or associate degrees, with bachelor's degrees in paramedicine or emergency medical services available in several nations, including Poland (Dabrowski et al., 2017) and Turkey (Catterall et al., 2016). While EMS personnel are trained to perform critical interventions rather than comprehensive diagnoses, they are equipped with skills for basic and advanced life support, including cardiopulmonary resuscitation (CPR), fracture splinting, spinal

immobilisation, and oxygen administration, emphasising the “load and go” principle (Al-Shaqsi, 2010). However, this model is losing popularity worldwide due to the simplicity of patient care. The literature suggests that only 30% of systems now use this EMS model (Page et al., 2013), with more countries utilising the Franco-German Model.

Franco-German Model

The Franco-German model is used more widely than the Anglo-American model (Al-Shaqsi, 2010). Unlike the previous model of minimal treatment, which involves loading the patient and rapidly transporting them to the hospital, the Franco-German model works on the principle of “stay and stabilise” or “delay and treat.” This model implies that paramedics, or in many cases, an emergency physician (Doctor), stay on the scene longer to diagnose the patient’s condition and manage it accordingly. Some countries’ services are based on the Franco-German model, including Germany, France, Austria, Greece, Malta, Finland, Latvia, Norway, Portugal, Russia, Slovenia, Sweden, and Switzerland. This model integrates an advanced life support model of care underpinned by educated, qualified, in most instances, emergency physicians who can effectively diagnose patients' conditions and manage them appropriately (Al-Shaqsi, 2010). However, this system's pitfall is that this model emphasises taking physicians out of the hospital environment. Therefore, there is an alternative to this model globally.

Mixed Model

In countries such as Australia, New Zealand, the United Kingdom, Canada, and certain states in the United States, paramedic service delivery models integrate elements from various international frameworks, including an evolving primary healthcare approach, and align with aspects of the Franco-German model, which emphasizes physician-led care and healthcare system integration (Page et al., 2013). These systems can be situated along a continuum of the Anglo-American paramedic model, as defined by Makrides et al. (2021), comprising the Professionally Autonomous sub-model, prevalent in Australia, New Zealand, and the UK, and the Directive sub-model, common in Canada and parts of the US. The Professionally Autonomous model features paramedics with a high degree of professionalisation, utilising advanced clinical technologies and evidence-based management practices within integrated healthcare systems. In contrast, the Directive model is characterised

by more protocol-driven practices aligned with public safety (Makrides et al., 2022). Across these regions, ambulance services have developed an extended scope of practice for managing medical and trauma-related emergencies, supported by evidence-based medicine. In Australia, paramedics rely on an extensive fleet of on-road ambulances, facilitating direct transport to Emergency Departments for specialised care (Page et al., 2013).

Road ambulances remain a critical mode of transportation for ambulance services in these regions, but variations exist, particularly in Australia and New Zealand, due to vast rural and remote communities, injury severity, and patient location. Aeromedical services, such as the Royal Flying Doctors, are frequently employed to address long distances, while helicopter services, provided by state or community-based organisations or both, are utilised in specific cases (Curtis & Ramsden, 2015). These services are typically staffed by paramedics and nurses, with doctors occasionally included, particularly in severe cases in rural areas, mirroring aspects of the Franco-German model where physicians are transported to patients (Curtis & Ramsden, 2015). This aligns with the Professionally Autonomous model's integration into healthcare systems, as described by Makrides et al. (2022), though Directive systems in Canada and the US may rely more on protocol-driven transport without physician involvement.

With the expansion of paramedics' scope of practice, distinct paramedic levels have emerged within ambulance services, reflecting increased professionalisation in autonomous systems (Curtis & Ramsden, 2015; Makrides et al., 2022). The following section explores the rapid historical shift in the scope of practice and educational training of paramedics.

2.2.3 Paramedic Education in Australia

Vocational Education Sector

The origins of vocational education and training (VET) in Australia can be traced back to the 1890s, when informal training programs were offered by mechanics' institutes and art schools (Goozee, 2001). However, it was not until the 1970s that formal reform of the sector began to take shape. In 1974, the landmark Kangan Inquiry into Vocational Education recommended the establishment of institutions now known

as Technical and Further Education (TAFE), laying the groundwork for a more structured national VET system (Bowman & McKenna, 2016).

During the 1980s, the VET sector advanced through the development of consistent nomenclature and a national core curriculum. A major milestone came with the release of the Dawkins Report in 1989, which introduced a national competency-based training framework and reclassified existing qualifications into the Australian Qualifications Framework (Bowman & McKenna, 2016). This laid the foundation for standardised training across diverse industries.

In 1992, the creation of the Australian National Training Authority (ANTA) further consolidated the sector by supporting the development of industry-specific competency standards and national training packages (Goozee, 2001). To maintain quality and compliance, the Australian Skills Quality Authority (ASQA) was later established as the national regulator of training providers.

Despite these national developments, paramedicine remained underserved in the VET sector. TAFE institutions held the authority to issue qualifications but did not deliver training specifically for the then-named 'ambulance officer'. In response to this gap, the National Education Committee of the Institute of Ambulance Officers developed a national set of learning outcomes and a paramedic-specific curriculum (Brooks et al., 2018).

Notably, ambulance services had begun establishing Ambulance Officer Training Centres (AOTCs) as early as 1961. These centres provided paramedic education in partnership with TAFE institutions, awarding qualifications that ranged from certificates to Associate Diplomas. These early initiatives played a pivotal role in formalising paramedic education prior to its eventual transition into the higher education sector.

Centralised (in-house) Training Model (Vocational Education)

Like other skills-based health professions, such as nursing, paramedics originated from in-house or vocational education and training pathways. This competency-based approach to training paramedics may well have been underpinned by the early works of Arthur Kornhauer (1927), as cited in Lee et al. (2013), the importance being an apprenticeship model with on-the-job training (Lee et al., 2013) and a specific focus on skills (Ryan & Halliwell, 2012).

The first official qualification offered to ‘ambulance officers’ commenced in 1978, when the Victorian AOTC introduced a Certificate of Applied Science. In subsequent years, South Australia, St John, and the Northern Territory (NT) followed Victoria’s lead. Ten years after the first formal VET qualification was offered, the level of qualification in Victoria and the NT was increased to an Associate Diploma qualification. Queensland was one of the last states to offer a qualification. The Associate Diploma was introduced in 1991, followed four years later by the first Advanced Diploma in Australia to be awarded to higher-level clinical paramedics (Brooks et al., 2018).

Paramedic training primarily focused on skills that comprised the current practice of paramedics, with a fundamental understanding of why these skills were being performed. There was widespread recognition that attaining clinical skills to a specified level of competency is essential to paramedicine. It was concluded that a curriculum should be planned around a conceptual framework ensuring that all graduates receive best practice information (Ball, 2005).

The structured training of Australian ambulance officers began in 1961 with the establishment of dedicated training schools by the Ambulance Service of New South Wales (ASNSW) and the Geelong and District Ambulance Service. Over the following decades, additional training schools emerged, with Queensland initiating its program in 1970 and Western Australia following in 1974 (Brooks et al., 2018).

Initially, ambulance training was managed internally by state and territory ambulance authorities, operating as unaccredited in-house programs. Curriculum development was primarily guided by medical advisory committees within government departments, with support from part-time medical directors of the ambulance service. The 1960s and 1970s witnessed significant advancements in emergency medical procedures, including the introduction of cardiopulmonary resuscitation (CPR) and advanced life support (ALS), which influenced the skill requirements of ambulance officers. By 1978, Western Australia became the first state to mandate Advanced Life Support (ALS) training for all ambulance officers. Victoria incorporated ALS into its curriculum in 1984, followed by the Northern Territory in 1995 (Brooks et al., 2018).

The 1974 Kangan Inquiry led to the establishment of Technical and Further Education (TAFE) institutions, providing national funding and standardisation opportunities for vocational education. In 1977, the National Education Committee of the Institute of Ambulance Officers developed a national set of learning objectives for ambulance officers. The first formal vocational qualification, the Certificate of Applied Science (Ambulance Officer), was introduced in Victoria in 1978. Subsequently, South Australia and the Northern Territory developed their vocational training programs in the 1980s. The Northern Territory launched an Associate Diploma of Emergency Care in 1987 and later introduced a Diploma of Paramedical Science (Ambulance) in 2002 (Brooks et al., 2018).

In Queensland, the formation of the Queensland Ambulance Service (QAS) in 1991 consolidated various community-based ambulance brigades, allowing for the introduction of structured statewide training programs. That same year, QAS launched an Associate Diploma of Health Science, which was later replaced by an Advanced Diploma in Paramedic Studies in 1995 to enhance paramedic capabilities (Woods & FitzGerald, 2002).

Australian state and territory TAFE authorities oversee paramedic education programs within the VET sector, requiring them to align with competency-based training (CBT) approaches to meet nationally defined standards. These programs focus on skill acquisition and practical application to ensure graduates meet industry expectations (McAllister & Nagarajan, 2015). In contrast, tertiary education institutions offering paramedic degrees must adhere to higher education accreditation requirements, emphasising broader educational outcomes beyond competency alone. As seen in nursing education, integrating competencies, educational philosophy, and curriculum structure plays a crucial role in shaping professional practice (Boore & Deeny, 2012).

Transition into a De-centralised Education Model

Initially identified as a model for VET, the competency-based model, a pass/fail approach (competent or not yet competent) to learning, became highly criticised as a simplified process for higher education (Perera et al., 2017). As paramedicine advances to higher education qualifications, the theory underpinning university-based paramedic education is supported by Tyler's objective-driven curriculum model

(1949), as cited in Lee et al. (2013). This model measures the learning objectives of paramedic courses through assessment, with success reinforcing the development of the curriculum. However, competency-based and objective-driven curriculum theories need to focus more on developing students' clinical judgement abilities rather than relying on either a competency-based assessment or a simplified level of understanding due to rote learning, which leads to a lack of proper, meaningful knowledge and an increase in judgment skills.

The notion that judgement skills come from learning outcomes rather than objectives leads to a curriculum focused on actual learning outcomes (Lee et al., 2013), an approach important to Paramedicine. Cooper's (2005) study on paramedic vocational education in the UK discussed the vocational model's focus on acquiring practical skills. Therefore, conflict arose with vocationally trained paramedics believing they were better trained and prepared than paramedic university graduates (Cooper, 2005). A further study by Edwards (2011) supported this notion by identifying concerns with the work readiness of university graduates from the perspective of a preceptor. The paper identified a correlation between practical rather than theoretical experience and patient outcomes (Edwards, 2011). A survey of a small cohort of students identified that universities need a comprehensive understanding of developing clinical and procedural skills to meet their future employers' needs (O'Brien et al., 2013). However, the limited number of studies in this area does not allow for validation or conclusive evidence on whether vocationally educated students are better prepared for higher education than their peers. A study by O'Brien et al. (2014) focused on the paramedic curriculum in higher education to prepare students for work readiness. This paper discussed the transition from baccalaureate degrees to actual practice and the issues educators must address to prepare them accordingly.

It is generally agreed that paramedics' education requires students to have a deeper and broader understanding of the human body and the healthcare systems. Deep learning can occur through a well-grounded tertiary curriculum (Willis, 2009). It ultimately requires the student to possess a proper theoretical understanding to cope with the complexity of applying the theory to practice (Hatlevik, 2012; Michau et al., 2009). Furthermore, paramedicine should be regarded as an evidence-based healthcare profession that utilises academic knowledge and skills applied in various high- and low-acuity situations across the health-illness continuum (O'Meara et al., 2015). It is

well established that paramedicine must evolve from a training-based model to a professional education framework for the future workforce (Donaghy, 2008; First et al., 2012; Willis, 2009). There is a precedent for such an approach; nursing care distanced itself from medicine and highlighted that they were more than just maternal care. Consequently, the nursing curriculum was structured to incorporate a professional emphasis on critical reflection and evidence-based practice. (Chinn & Falk-Rafael, 2018).

Over the past 40 years, the role of a paramedic has undergone considerable changes. From drivers and bearers who took the sick and injured to the hospital, they are now specialised paramedics who perform many interventions before a patient arrives at the emergency department. As a result of this increase in the scope of practice, the role of education must also evolve.

De-centralised Education Model (Higher Education)

Higher educational qualifications, such as undergraduate and postgraduate studies, are required to increase professionalism (Duckett, 2000). As previously discussed, paramedicine education and training in Australia and New Zealand has progressed from an ambulance service-supported Diploma to a pre-employment university program awarding a bachelor's degree. A similar progression has been evident in nursing, with a bachelor's degree established as the initial qualification or entry into practice for nurses and specialisations such as midwifery, intensive care, and emergency nursing provided at the postgraduate level.

The first iteration of paramedics in the Australian tertiary education university system began in 1994, with Charles Sturt University implementing the pre-employment model. Students completed a paramedic program as part of their university education, equipping them with the necessary skills and knowledge to enter the workforce as qualified paramedics upon graduation. The state of paramedic education in tertiary education progressed rapidly after 1995, following a national consortium of educators and senior management from ambulance services' discussion on the future scope of paramedic education (Grantham, 2004). There has been a transition from a vocational training model to 18 universities offering bachelor's degrees that are either currently accredited or in the process of achieving full

accreditation status. With the increasing number of universities offering paramedic qualifications, the frequency of student enrolments has also been affected.

The emergence of paramedic education across higher education institutions has progressed rapidly, resulting in the delivery of varying single, double, and postgraduate qualifications. As of 2021, there were 8,700 students enrolled in accredited paramedic programs in Australia (Productivity Commission, 2023). This educational approach for training paramedics within the university establishes a model in which theoretical and practical learning environments are delineated, fostering a high level of expertise and bridging theoretical knowledge with the practical aspects of prehospital care.

As paramedicine continues to professionalise, the increasing complexity of its scope necessitates a robust educational foundation informed by well-established pedagogical and theoretical frameworks. Expanding paramedic roles beyond traditional emergency response to primary health care and community-based care requires an educational approach that fosters adaptability, critical thinking, and interdisciplinary collaboration. This shift highlights the need for curricula that integrate theoretical knowledge with practical application, ensuring graduates are well-prepared to navigate diverse clinical environments. As a result, paramedic education must evolve to incorporate a range of learning theories that support competency development, lifelong learning, and the ability to respond effectively to changing healthcare needs. These pedagogical and theoretical frameworks play a crucial role in guiding curriculum design, instructional strategies, and professional development, ultimately shaping the future workforce of paramedicine.

2.2.4 Pedagogical and Theoretical Frameworks for Paramedicine Education

The scope of practice for paramedics is rapidly evolving, encompassing traditional emergency medical care and expanding into primary healthcare services. This evolution demands adapting educational practices to ensure paramedics have the necessary knowledge, skills, and competencies to meet these challenges. Theories and pedagogical frameworks are central to shaping paramedicine education, guiding curriculum development, instructional design, and professional development. This literature review examines the theoretical and pedagogical frameworks underpinning paramedicine education, with a focus on emergency medicine and primary healthcare,

while emphasising the need for continuous learning and adaptation in response to evolving practice contexts.

Lifelong learning is a cornerstone of professional development in paramedicine, as it ensures paramedics remain responsive to advances in medical technology, evolving healthcare systems, and emerging patient needs. Bryant et al. (2023) argue that lifelong learning is essential for paramedics to adapt to the increasing complexity of their role, particularly as they are increasingly tasked with providing care in pre-hospital and community settings. The dynamic nature of paramedicine practice requires a shift in educational models that encourages continuous improvement and reflection, integrating new knowledge into practice to address technical advancements and environmental challenges.

Integrating lifelong learning principles within paramedicine education fosters professional growth by emphasising the importance of adapting to an ever-changing landscape. A key focus is developing self-directed learning capabilities, where paramedics continuously reflect and self-assess. This allows them to tailor their development in response to both individual career trajectories and the shifting demands of the profession.

Pedagogical Frameworks in Paramedicine Education

Pedagogical frameworks in paramedicine education are critical to shaping the curriculum and educational strategies used to educate future paramedics (Bell et al., 2021). The application of adult learning theories is particularly relevant in this context, as paramedics typically engage in formal education later in life with varying levels of prior experience. Campbell & Tran. (2023) identify four dominant adult learning theories—cognitivism, constructivism, behaviourism, and connectivism—which are instrumental in guiding the design and delivery of paramedicine education.

Cognitivism and Behaviourism

Cognitivism focuses on how learners acquire and organise information, highlighting the importance of internal processes such as memory, attention, and problem-solving. In paramedicine education, this framework emphasises the development of foundational knowledge and technical skills. Kurt (2023) notes that cognitivism underpins the development of structured curriculum content, such as acquiring medical knowledge and clinical decision-making skills, which paramedics

must apply in high-pressure emergencies. By emphasising the cognitive processes involved in decision-making, cognitivism supports the development of critical thinking skills, which are essential for paramedics to assess patient needs and determine appropriate interventions in emergency care contexts.

Similarly, behaviourism, focusing on observable behaviour and the reinforcement of desired responses (Sam May-Varas & Margolis, 2023), is a key framework for skills development in paramedicine. Behaviourist strategies are applied in paramedic education through scenario-based training, practical exercises, and simulations that reinforce specific skills such as patient assessment, airway management, and trauma care. Learners must demonstrate competence in performing critical procedures through repetition and reinforcement. Behaviourism provides a foundation for establishing standard procedures and protocols that paramedics can follow in emergencies, ensuring patient safety and high-quality care.

Constructivism

Constructivism, a learning theory that emphasises active engagement and knowledge construction, is pivotal in modern paramedicine education. This framework, which emphasises the learner's role in creating meaning through experience (Allen, A. 2022), aligns with the need for paramedics to develop problem-solving and critical thinking skills. The theory is particularly relevant in paramedicine education, as it encourages learners to engage with real-world problems and complex scenarios, promoting deeper learning through reflection and discussion. Wheeler & Dippenaar. (2020) emphasises the importance of scenario-based learning and experiential education in paramedic training. By engaging in realistic scenarios that mimic the challenges faced in the field, paramedic students develop the critical thinking and clinical reasoning skills needed for autonomous practice in emergency and primary healthcare settings.

Constructivism also emphasises the importance of collaborative learning (Allen, A. 2022). In paramedicine, this is often achieved through team-based simulations and interprofessional education, where students work with professionals from other healthcare sectors to address patient care needs. This collaborative approach reflects the interconnected nature of paramedic work, particularly in primary health care, where paramedics must work with other providers, including doctors, nurses, and mental health professionals, to deliver integrated care.

Connectivism

Connectivism, a theory developed by Siemens (2005), proposes that knowledge is distributed across networks and that learning creates connections within these networks. This framework is increasingly relevant in paramedicine education, particularly in integrating technology into the learning environment. Benjamin et al. (2023) argue that connectivism facilitates the incorporation of digital tools, simulations, and online learning platforms, all of which are relevant to paramedic education. Using online resources, virtual simulations, and collaborative learning platforms enables paramedics to access and share knowledge across geographic boundaries, making it possible to engage in lifelong learning without being constrained by time or location. Moreover, technology in learning mirrors the increasing role of digital tools in paramedic practice, where devices such as portable diagnostic equipment and mobile health apps are becoming standard tools.

Connectivism also emphasises the significance of networks and communities of practice, encouraging paramedics to connect with peers, mentors, and experts in their field. These networks are critical in developing paramedics' skills and knowledge, supporting a collaborative learning and patient care approach.

Addressing the Evolving Scope of Practice in Paramedicine

As paramedicine expands beyond traditional emergency response into primary health care, the theoretical frameworks discussed above should be adapted to address new challenges. Incorporating primary health care into paramedicine requires paramedics to develop competencies in health promotion, disease prevention, chronic disease management, and mental health care. O'Meara et al. (2017) emphasise the need for paramedic education to reflect these changes, advocating for a curriculum that integrates mental health training, collaborative care, and community-based practice.

Integrating these topics within paramedic education necessitates an ongoing shift in pedagogical approaches, with a greater emphasis on holistic, patient-centred care. As the scope of practice expands, so too does the need for paramedics to engage in complex decision-making, necessitating their ability to navigate the social determinants of health and consider the broader context of patient well-being. This shift aligns with the principles of constructivism, which advocate for learning that reflects the real-world complexities of practice.

Challenges and Future Directions

The implementation of these pedagogical frameworks within paramedicine education is not without challenges. While integrating these theories can enhance learning outcomes, significant barriers exist to their implementation, including limited resources, resistance to change, and the need for faculty to be trained in new pedagogical approaches (Ertmer & Newby, 2013). Additionally, as paramedic education increasingly incorporates digital tools and online learning environments, the potential for digital divide issues must be considered, particularly for students in remote or underserved areas.

The evolving scopes of practice in paramedicine demand an education system that is flexible, adaptive, and responsive to both technological advancements and changing patient needs. Applying pedagogical and theoretical frameworks—particularly those grounded in lifelong learning, cognitivism, behaviourism, constructivism, and connectivism, plays a critical role in shaping paramedicine education. By integrating these frameworks, paramedics can develop the knowledge, skills, and competencies necessary for effective emergency and primary healthcare practice. Moving forward, the continued adaptation of these frameworks will be necessary to ensure that paramedic education remains relevant and effective in preparing future practitioners for the challenges of modern health care.

2.2.5 Progression of Paramedicine in Australia

Historically, ambulance services in Australia primarily served a transport function—moving the sick and injured to hospital facilities as quickly as possible (Moritz, 2018). Medical care was almost exclusively the domain of hospital-based professionals, with doctors and nurses providing treatment upon the patient's arrival (Chamberlain, 2018). During this early period, clinical developments in ambulance services focused not on patient care but on improving transportation methods to ensure safe and timely delivery to hospitals (Davis, 2017).

In the mid-20th century, particularly following the influence of military medical services and global emergency care advancements, there was growing recognition of the need for care enroute. This period saw the emergence of the "paramedic" role internationally, with Australia beginning to explore models of prehospital care beyond basic first aid and transport. The 1970s and 1980s marked the beginning of formalised

training programs, although much of this training remained vocational and in-house, delivered by ambulance services themselves. This form of training largely relied on procedural knowledge and pattern recognition rather than critical thinking or clinical reasoning (Murdoch, 2019; Ryan & Halliwell, 2012).

As prehospital care became more complex in response to community health needs, particularly in the 1990s and early 2000s, the limitations of traditional training models became apparent. The profession increasingly recognised the need for a shift from task-based training to education grounded in evidence, theory, and reflective practice (Grantham, 2004). Support from allied disciplines such as nursing and medicine helped scaffold early academic paramedicine programs, often borrowing established content while contextualising it for out-of-hospital care (O'Meara, Furness, & Gleeson, 2017).

The evolution of paramedicine's scope of practice has further driven educational reform. Paramedics are now expected to manage a wider range of clinical presentations, including mental health crises, chronic conditions, and community-based health assessments (O'Meara et al., 2016; Eaton et al., 2021). These changes have solidified paramedicine as a distinct and versatile health discipline capable of delivering early interventional care and improving population health outcomes (Le May et al., 2010).

A significant turning point came with the national registration of paramedics in 2018. This introduced mandatory accreditation for all paramedicine programs delivered by higher education providers in Australia. Programs are now assessed against national accreditation standards to ensure that graduates possess the knowledge, skills, and professional attributes to practice competently and safely (Australian Health Practitioner Regulation Agency, 2016). While accreditation promotes quality and safety, literature suggests that academic programs must also remain responsive to industry needs and community expectations (Smith, 2017). As such, education is not only a response to professional evolution but also a driver of it—positioning learning as central to the future of paramedicine.Therefore, the role of accrediting higher education paramedic programs formerly overseen by the Council of Ambulance Authorities (CAA) and now governed by the Paramedicine Board of Australia (PBA) under the Ahpra system, requires further critique in the literature to evaluate how these evolving frameworks address the current and future needs of the

paramedic profession. The following section reviews the literature to determine whether higher education, supported by a – National Accreditation and Registration Scheme (NRAS), prepares students for the evolving scope of practice of a paramedic.

2.2.6 Paramedicine's Scope of Practice

In the early 2000s, the Australian paramedicine profession experienced key organisational shifts. Paramedics Australasia (PA) and the Australian and New Zealand College of Paramedicine (ANZCP) both emerged from the Australasian College of Ambulance Professionals (ACAP), which had previously unified the profession's interests across Australasia. Following a strategic split, ANZCP was formed, while PA continued independently. Despite operating separately, both maintained a shared goal of advancing the profession. In 2018, aligned with national registration and a collective desire for a unified voice, PA and ANZCP merged to form the Australasian College of Paramedicine (ACP), now serving as the primary professional body representing paramedics across the region (PA, 2014; ANZCP, 2016).

Unlike the UK College of Paramedics, which has published formal curriculum guidance since 2006, no such standardised national curriculum has been implemented in Australia. While PA published an initial scope of practice in 2014, no updated editions have followed, leaving a gap in guiding curriculum content and career development frameworks.

Scopes of practice are guidelines that determine the extent and limits of the medical procedures that a healthcare provider may perform (Partners, 2019). The guidelines are an extension of an existing role or a new role that reflects the evolution of the discipline's abilities to protect the public better and enhance society's access to healthcare (Kopanos, 2014). The profession of paramedics is governed by a scope of practice that outlines the permissible clinical procedures and guidelines to follow based on the individual's certification or licensure (Hoke & Hexem, 2017). Little, if anything, has been written about the relationship of accreditation to the current and evolving scope of practice. This thesis emphasises that the accrediting body should be clear about its objectives for accreditation; for paramedicine, these objectives focus on current and emerging trends in healthcare and societal needs that could significantly impact the paramedic profession in the future.

Although the term 'scope of practice' is a universal concept, within Australia, paramedicine has a regulated scope of practice that requires endorsement by the PBA. The PBA's definition of the scope of practice builds on the foundation of the paramedic scope of practice introduced through the previous professional body, Paramedics Australasia. However, there is confusion surrounding the scope of practice, which is further complicated by the varying clinical positions and practice guidelines across the different Australian ambulance services (Flanagan et al., 2024; Wilkinson-Stokes et al., 2021). While the following section defines the scope of practice from an international, national, and state perspective, for the context of this thesis, the evolving scope of practice is significant.

The International Paramedic Registry (IPR) collaborates collegially across the United States of America (USA), Canada, Australia, the United Kingdom (UK), and Latin America in defining the scope of practice for paramedicine. It defines the scope of practice as follows:

> Paramedicine is a specialised profession and an essential component of a healthcare system. The paramedic is a professional whose primary focus is to provide immediate, episodic, and unscheduled health care to individuals, families, and communities. Their care is patient-centred and focused on attaining and maintaining optimal health and quality of life. A paramedic's practice is specialised in, but not limited to, emergency care and transportation. The paramedic works in various environments, under high-risk conditions, and in special events such as disasters and mass casualty incidents. Their care is delivered predominately outside hospitals but may also include clinic and in-hospital settings (International Paramedic Registry (IPR), 2019).

While the IPR and the models of care guide paramedicine's scope of practice internationally, regulatory bodies within Australia facilitate a national approach to paramedicine's scope of practice. As explained in Chapter One, ambulance services in Australia define their scope of practice through a Certificate of Clinical Practice or equivalent within their state or territory's legislative framework. Therefore, the scope of practice is usually statutorily defined in each ambulance service's clinical practice guidelines (The Council of Ambulance Authorities Inc., 2012).

Nonetheless, Australia's current regulatory and employment structures have not yet caught up with these global shifts. As such, while it is possible to describe various models and descriptors—including those provided by the PBA, IPR, and national competency standards—there remains considerable ambiguity around what constitutes a paramedic's scope of practice, particularly for those outside traditional ambulance settings.

This thesis does not attempt to endorse any single definition but acknowledges that the scope of practice in Australian paramedicine is in a state of flux. In the context of this research, the focus remains primarily on the scope of practice as defined and applied within JAS environments, where most paramedicine graduates initially seek employment. However, future research and policy efforts should engage more directly with defining and regulating the scope of practice for paramedics working in non-JAS contexts.

However, nationally, since registration, any use of the skills and knowledge that impacts patient outcomes through the effective delivery of care by someone in an ambulance service is considered practising under the scope of a paramedic (Ahpra, 2016). In conjunction with the national competency standards, PA also published role descriptors. PA established the paramedical role descriptors to introduce Australia's current clinical positions and scopes of practice. The table below (Table 2.1) describes the various clinical positions, their respective scopes of practice, and the level of education reflected in the position descriptions provided by the PA. Later in this chapter, these roles will be expanded to discuss paramedicine's scope of practice within one Australian ambulance service, Queensland.

Table 2.1: Clinical Positions within Ambulance Services, as described by PA.

Clinical Position	Scope of Practice
First-responder	Advanced first aid includes splinting fractured limbs and basic pain relief medication, performing Cardiopulmonary Resuscitation (CPR), and basic airway management for a patient suffering a cardiac arrest, sometimes providing automatic external defibrillation.

Patient transport officer (PTO)	They can provide basic care (including specialised ambulance equipment and basic clinical procedures) and specialised transport for non-emergency patients.
Paramedic	Their scope of practice includes but is not limited to advanced care procedures and drug therapy protocols.
Intensive-care paramedic (ICP)[3]	They are trained in advanced prehospital care skills, including critical care procedures, and can access a wide range of pharmacological treatments to care for their patients.
Flight Paramedic/ Retrieval Paramedic / Flight Critical Care Paramedic	They perform emergency response, inter-facility retrieval, and routine transports. Most are trained at the intensive-care paramedic level but have additional training in rescue techniques and aviation medicine.

(Paramedics Australasia, 2024)

Each state and territory's ambulance service is a member of the CAA and has adopted the CAA competency standards, as well as, to some extent, the role descriptions published by PA. Each ambulance service uses a variety of terms to describe a clinical position. Still, there is also a degree of similarity between the titles for paramedics with similar skill sets and scopes of practice.

Each ambulance service is an independent statutory body responsible for a paramedic's scope of practice (Paramedicine Board of Australia, 2021). The ambulance service provides a scope of practice framework for paramedics under its jurisdiction, outlining the relationships between the different levels of paramedics as identified in Table 2.1. Unlike the CAA and PBA, ambulance services locally uphold their scope of practice by adhering to clinical practice guidelines and procedures, encompassing an evolving array of skills, pharmacology, and competencies for emergency treatment. While the core skills list remains constant, individual communities necessitate adaptable standard practices tailored to meet local needs. (Miles, 2019). Locally, ambulance services maintain the scope of practice through clinical practice guidelines and procedures, which are an evolving list of skills, pharmacology, and competencies for emergency treatment. Therefore, while the list is

[3] ICP in this context incorporates Critical Care Paramedic (CCP) and Mobile Intensive Care Ambulance (MICA) Paramedic

static, individual communities require that standard practice be responsive to local needs.

It is evident that the scope of practice is a crucial aspect of patient care provision (Leslie et al., 2021); furthermore, the scope of practice is continually evolving (O'Meara et al., 2017). Ambulance services currently operate within a traditional emergency medical response system, with the scope of practice of paramedics encompassed within this model. This model reflects that paramedics respond only to emergencies (O'Meara & Duthie, 2018). Previous research has also supported the application of an emergency medicine framework by paramedics in the prehospital setting (Campeau, 2008). Therefore, the scope of practice has evolved from merely transporting patients to providing advanced clinical interventions that vary according to local needs and were once only performed in hospitals (O'Brien et al., 2014).

Consequently, it seems essential to investigate how the evolving scope of practice is conceived by ambulance services, given the fluctuating clinical skill levels of paramedics (Rasku et al., 2019). As discussed in this chapter, the difficulty with this investigation lies in the fact that varied approaches and Emergency Medical Systems (EMS) models of care are required to meet the ambulance service's care goals for society. Nevertheless, understanding the changing scope of practice in paramedicine as a significant factor in the evolution of paramedicine education is essential. This is a crucial outcome of this study and warrants a more comprehensive review of the evolving scopes of practice through the lens of paramedicine.

2.2.7 Paramedicine's Evolving Scope of Practice

To address Objective One of the thesis, we will first define what constitutes a change in the scope of practice. This entails examining the historical development and current state of paramedic practice in Australia, along with the educational, regulatory, and professional frameworks that underpin it. By understanding this context, we aim to determine whether the evolving scope of paramedicine represents an extension or expansion of its current role.

The Australian Health Practitioner Regulation Agency defines the scope of practice as the professional roles and responsibilities that an individual health practitioner is educated and competent to perform, with a change in scope of practice

being a description of the new types of duties one could be expected to undertake (Paramedicine Board of Australia, 2018). A change in the scope of practice could be an extension of an existing role or an expansion of their role by introducing a new role that reflects the evolution of the discipline's capabilities to protect the public better and enhance consumer access to healthcare (Kopanos, 2014).

A shift in the scope of practice within a professional discipline can manifest in two distinct ways: extension and expansion. Extension involves broadening the existing role's responsibilities and capabilities, allowing practitioners to delve deeper into their field while operating within familiar parameters. On the other hand, expansion entails introducing entirely new roles within the discipline, reflecting advancements and innovations in the field's expertise. This evolution enhances practitioners' versatility and effectiveness, enabling them to adapt their practices to meet the profession's evolving demands and challenges.

The integration of paramedicine within health services and the redefinition of paramedic roles through the extension and expansion of traditional clinical practice will be explored internationally, nationally, and at the state level in Australia.

Extension and expansion of paramedic roles

Figure 2.1 is a schematic representation of the evolution in the scope of practice of paramedicine, illustrating how new and existing roles are developed in response to the requirements of the healthcare system. In the evolving landscape of healthcare, the demand for innovative roles and expanded practices is driven by new health care needs. This process begins with the identification of a "New Health Care Need," which serves as the foundation for adapting and enhancing clinical services. The figure illustrates two primary pathways: the Extended Scope of Practice and the Expanded Scope of Practice, each addressing these needs in distinct ways.

The Extended Scope of Practice focuses on building upon existing roles. When a new health care need arises, it can lead to an Extension of Existing Role, where current clinical practices are broadened. This might involve an Increase in Breadth of Clinical Practice, allowing practitioners to take on more diverse responsibilities within their established scope. Alternatively, the extension can involve an Extension to Current Clinical Practice, where the role remains the same but adopts different

classifications or focuses, adapting to the new demands without altering the core identity of the role.

On the other hand, the Expanded Scope of Practice introduces entirely new dimensions to healthcare delivery. A "New Role" may be created to address the identified need, potentially evolving into a New Specialist Role as expertise deepens. This pathway reflects a significant shift, where the healthcare system develops specialised positions to meet complex or emerging challenges.

As identified through the previously discussed models of care, the prehospital environment has had a momentum swing from the initial role, which was limited to transportation and little clinical care, to providing high-quality treatment and emergency care to an improvement across the health spectrum, starting with primary health care or health promotion (O'Meara et al., 2015).

The literature suggests that ongoing changes in the healthcare system, including the overloading of this system due to an aging population, the rapid growth of the migrant population, and increased co-morbidities (Australian Institute of Health and Welfare, 2022), require an extension of paramedicine's scope of practice (Van-Vuuren et al., 2021). The community's healthcare needs and evolving delivery models, combined with emerging technologies and shifting health conditions, treatments, and societal expectations of the service, form the foundation for modifying the scope of practice in the healthcare sector (Kopanos, 2014). Despite international calls for reform over the past 25 years, such as those by Bissell et al. (1999) in the U.S., the Australian paramedicine profession continues to face ongoing challenges around reclassification and role adjustment, with limited substantial progress to date.

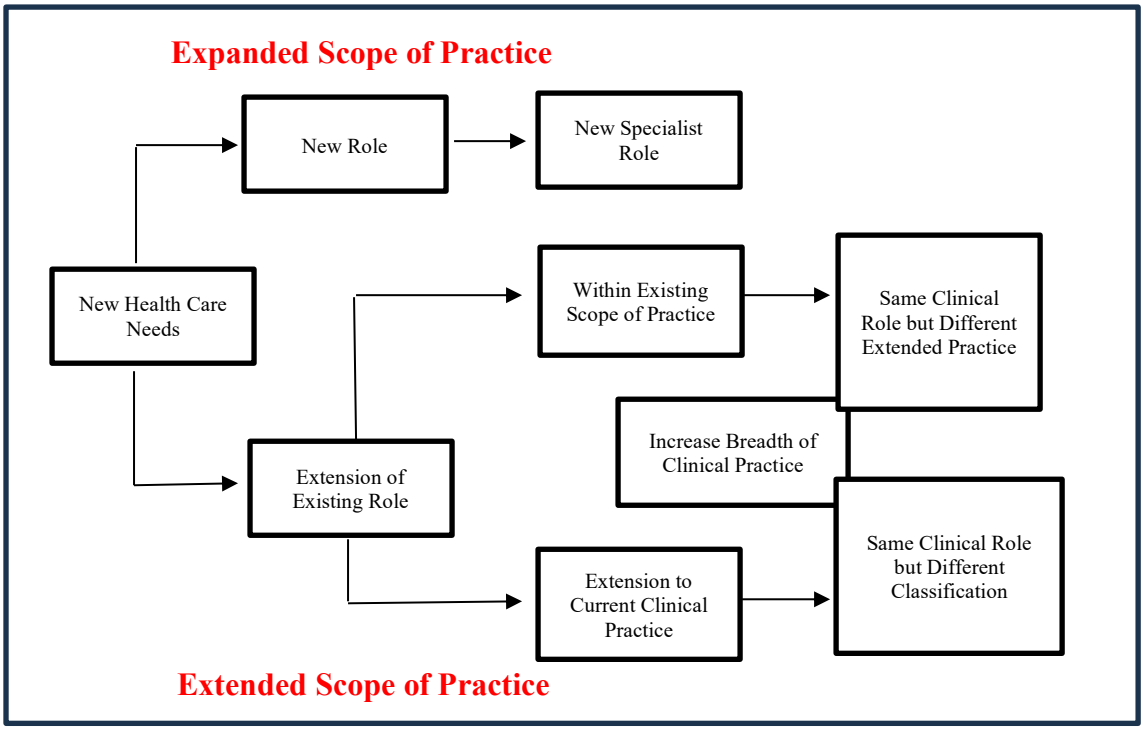

Figure 2.1 Changing the Scope of Practice

The definition of paramedics' role expansion in Australia has yet to be well published. Therefore, other health professions were reviewed to recognise what constitutes an expanded scope of practice. The Pharmacy Practitioner Development Committee reviewed the term ‘expanded’ to describe pharmacy professional practice, defining it as attaining additional expertise sufficient to provide services or perform tasks outside the usual scope of practice of the profession (Jackson et al., 2015).

Evidence from Australian paramedic practice supports this alignment. Spelten et al. (2023) note that community paramedicine models are alleviating system pressures yet require further structural integration. The Royal Flying Doctor Service (2023) highlights the potential for expanded paramedic roles in non-traditional environments, such as aeromedical and community settings. Shannon et al. (2022) report on community paramedicine programs that reduce acute healthcare utilisation and improve patient outcomes. Furthermore, a 2022 scoping review of rural paramedicine practice identified that enhanced scopes of practice and broader community roles positively affect patient outcomes (Muir et al., 2022). These examples reflect the same concept embedded in the pharmacy definition: expansion through capability and additional expertise, not merely role substitution.

Expanded scope of practice- National Perspective

Previously, in this chapter, we discussed EMS within the scope of practice of paramedicine. An initial change in the scope of practice of paramedicine involves transitioning paramedicine practice from its traditional role, thereby introducing a more advanced and expanded scope of practice (von Vopelius-Feldt & Benger, 2013). An example of an ambulance service focusing on an expanded scope of practice is introducing Critical Care Paramedics (CCP) or equivalent, diversifying diagnostic tests and clinical interventions, and delivering emergency healthcare (Emergency Medicine Foundation, 2021).

Paramedicine's expanded scope of practice nationally revolves around clinical positions, such as CCPs and flight paramedics, as well as equivalence across ambulance services. Critical care paramedics are highly skilled and trained, performing advanced medical procedures that extend beyond the general scope of practice of most paramedics (Paramedics Australasia, 2024). The flight paramedic, or an equivalent advanced clinical practitioner in paramedicine, provides medical assessment, treatment, and care in the out-of-hospital environment to facilitate the safe and effective transfer of critically ill patients to a specialist receiving facility (Paramedics Australasia, 2024, p. 7). Paramedicine's role within the community's healthcare structure is essential; a framework to support team-based models of primary healthcare must build capacity, broaden healthcare providers' availability, and improve patient care quality (Naccarella et al., 2013).

2.2.8 Paramedicine's Extended Scope of Practice

If a paramedic has acquired specific patient assessments and procedures to care for a patient and non-action by the paramedic may affect the patient outcomes, then role extension has been recommended (McCann et al., 2018). Internationally and nationally, paramedicine is recognised as an essential extension to the current primary health care teams, changing roles and responsibilities within primary care (Naccarella et al., 2013). Internationally, the scope of practice for paramedicine has also evolved from a high-acuity and emergency healthcare model to primary healthcare (O'Meara, Stirling et al., 2015). In terms of change in the practice of paramedics nationally, it is now evident through a report by the Productivity Commission into Government Services that identified the percentage of non-emergency cases increased by almost

29% in four years since 2014 while emergency cases attended to by paramedics has decreased nearly 1% since 2014 (Productivity Commission, 2023).

Extended scope of practice- National perspective

Ambulance services integration within health services, extending access to primary health services, and providing prehospital emergency care are key components of a model of care transitioning from traditional emergency response to a hybrid care model that incorporates primary health (Godfredson, 2018). Previously, several ambulance services in Australia were part of an emergency services department. Ambulance services are now situated within the portfolios of health departments (Ambulance Tasmania, 2021; Queensland Ambulance Service, 2021) or as an agency of the health department (New South Wales Ambulance Service, 2021).

The Paramedic Practitioner (PP) is an emerging and now formally legislated role within the Australian paramedic profession, offering an advanced scope of practice that bridges emergency and primary healthcare. In 2024, the Victorian Parliament passed the Paramedic Practitioners Bill, enshrining this role in law and making Victoria the first Australian jurisdiction to do so (Thomas, 2025). This legislative development enables Paramedic Practitioners to assess, diagnose, and treat a range of subacute and non-acute conditions in the community, significantly alleviating pressure on emergency departments. Equipped with advanced clinical training, these practitioners can now prescribe and administer scheduled medicines, deliver wound care, manage minor infections, and treat musculoskeletal injuries in the field. The role, supported by a Master's program developed by Monash University in partnership with Ambulance Victoria and Safer Care Victoria, is positioned to transform out-of-hospital care, particularly in regional areas, by expanding the clinical autonomy and leadership capacity of experienced paramedics. Earlier conceptualisations of the PP role, such as those by O'Meara et al. (2015), anticipated this shift by advocating for integration with aged care, primary health, and social services. Recent literature continues to support the alignment of this role with broader system reforms that enhance access, continuity, and quality of care (Paramedics Australasia, 2024; Eaton et al., 2020; Eaton, Wong et al., 2021; Tavares, Bowles, & Donelon, 2016)..

2.2.9 Education's Impact on Paramedicine's Scope of Practice

Having already discussed the fact that paramedic clinical care is evolving, the literature supports the notion that paramedicine must continually stay current with the changing field of medicine and prehospital care (Corcoran et al., 2016; Heath & Radcliffe, 2010). This need for increased disciplinary knowledge can be achieved with enhanced educational practices that support learning (Goldman et al., 2016).

On the one hand, there is a clear understanding that the current era of ambulance services has ascended to a modernised upgrading of clinical care provided to the community, extended scope of practice of paramedicine, and an expanded scope of care buoyed by an elevation in educational standards (Chilton, 2004; Makrides et al., 2021). Conversely, the literature suggests that these extended clinical roles encompass not only a comprehensive range of skills but also require more formal education due to research, technological advances, and diagnostic capabilities, all of which are augmented by changes in societal healthcare needs (Dopson, 2007; Flynn et al., 2015). The literature raises a question: What degree of education is warranted for paramedics' extended scope of practice? Answering this question will fulfil the research objective of describing and evaluating the theoretical basis for current educational programs and their application through curricula.

Current literature identifies a changing role of paramedics in their position as front-line healthcare professionals (Heath & Radcliffe, 2010; O'Brien et al., 2014). Therefore, as the traditional role of paramedics has evolved into a clinical role to meet public health needs, current baccalaureate education must be more comprehensive (O'Brien et al., 2014; Leggio et al., 2021). The issue arises, and we need to address objective four to develop a theoretical basis for future practice, accreditation, and curriculum development. With a changing scope of practice focused on primary health care and low-acuity work (O'Brien et al., 2014), it is essential to confirm that higher education curricula prepare students for employment within the evolving prehospital environment (Thompson et al., 2015). It is necessary to recognise paramedic students' perceptions of paramedics' changing role and identify if the current curriculum supports their transition into practice and the changes required to prepare them for employment (Hickson et al., 2015; Johnston & Bilton, 2020). To ensure that students are comparably educated to take advantage of job opportunities and that employers are

aware they have job-ready students, mechanisms are required to ensure that programs meet best-practice global curriculum standards (Jackson, 2016).

The role of paramedics has traditionally been centred around emergency response and pre-hospital care. However, recent shifts in healthcare models have led to their increasing integration into primary care settings (O'Meara et al., 2017; Eaton et al., 2021). This evolution reflects broader efforts to address healthcare workforce shortages, improve patient access to care, and enhance community-based health services (Williams et al., 2021). Recent research by Eaton et al. (2025) provides a realist evaluation of paramedics' contributions within primary care, offering insights into how education, policy, and practice frameworks must evolve to support this transition.

This recent research by Eaton et al. (2025) provides a realist evaluation of paramedics working in primary care across the UK and Canada, identifying 50 context–mechanism–outcome configurations (CMOCs) across three key themes: expectations of the paramedic role, the transition into primary care, and role clarity within interdisciplinary teams. Their findings highlight that effective integration requires structured supervision, ongoing formal education, and clearly communicated role boundaries to both patients and primary care staff. These mechanisms foster trust and legitimacy and help to avoid role ambiguity, which can undermine collaboration and service efficiency. While these insights offer a valuable framework for understanding how education, policy, and practice might evolve to support paramedics in primary care, they are grounded in international health systems with differing regulatory, funding, and workforce models. As such, caution must be exercised when translating these findings to the Australian context, where community paramedicine remains emergent, and systemic support for role integration, such as funding, supervision infrastructure, and role clarity, remains inconsistent. Nonetheless, the study offers transferable insights into the conditions under which paramedics can meaningfully contribute to primary care and highlights areas for further empirical investigation within Australia.

The concept of social responsiveness in paramedic education is gaining prominence as the profession expands beyond emergency response into broader healthcare domains, including primary healthcare, chronic disease management, and mental health intervention. Social Responsiveness in Paramedic Academic Programs

(Kengis & Teed., 2025) presents a framework for embedding social accountability within paramedic curricula, emphasising the need for education programs to address health inequities and meet the needs of diverse populations. This aligns with contemporary discussions on paramedic competency frameworks, which advocate for the inclusion of social and cultural responsiveness alongside clinical and technical skills. Unlike nursing and medicine, which have well-established national curriculum frameworks emphasising social responsibility, paramedicine lacks standardised educational guidance in this area, leading to variability in how universities prepare graduates for socially responsive practice. Incorporating structured approaches to social accountability in paramedic education could enhance graduate preparedness for roles in underserved and vulnerable communities, reinforcing the profession's evolving identity within the healthcare system.

A previous study highlights that paramedics working in primary care perform a range of non-traditional tasks, including chronic disease management, preventative healthcare, and interdisciplinary collaboration with general practitioners and nurses. These findings align with the existing literature, which argues for the greater integration of primary healthcare competencies in paramedic education (O'Brien et al., 2014). However, many current paramedic programs lack structured training in long-term patient care, navigating the health system, and interprofessional teamwork, resulting in inconsistent preparedness for non-emergency roles (Smith, 2017).

Furthermore, the study underscores the need for revised accreditation frameworks that recognise primary healthcare competencies as core to paramedic practice. While traditional competency-based training focuses primarily on acute care, a shift towards more adaptive, patient-centred educational models is necessary to support the expanding scope of paramedic roles (O'Meara et al., 2015). By integrating insights from this realist evaluation, this literature review highlights the urgent need for reform in curriculum and accreditation to ensure paramedics are adequately prepared for the evolving demands of healthcare.

In light of the evolving demands within paramedicine, aligning educational programs with best-practice global curriculum standards is crucial to equip students for diverse job opportunities and ensure their readiness for the rapidly changing healthcare landscape. O'Meara's (2015) journal article builds on previous literature, highlighting that higher education programs can shift the focus of paramedicine

curricula from an emergency response model to include primary health care. This insight, derived from the preceding literature review, has led to the formulation of the following research objectives:

Describe the history and current status of paramedic practice in Australia, including the educational, regulatory, and professional frameworks that support it.

Describe and evaluate the theoretical basis for current academic programs and their application through curricula.

2.2.10 Summary and Implications

Like other skills-based health professions, such as nursing, paramedicine started its educational origins through an accredited industry-based vocational education and training pathway (Brooks et al., 2018). The establishment of education of paramedics within Australia has previously been through reputable disciplines such as nursing and medicine that provided the underpinning knowledge that they perceived as prehospital care (Brooks et al., 2018). Again, like nursing, paramedic education in Australia has transitioned from vocational education and competency-based programs to a more formal study program within the higher education sector (Hou et al., 2013; O'Brien et al., 2014).

During the 1990s, the role of paramedicine began to evolve rapidly, with the relatively standardised role of the paramedic expanding to include new clinical positions, such as Intensive or Critical Care Paramedics, and discussions around paramedic practitioners also emerged from the early 2000s (Woollard, 2006; O'Meara, 2003). As the profession began to evolve away from the traditional paramedic role, it started to question the current underpinning knowledge of its practice, necessitating a shift in focus from training to education (Grantham, 2004).

Several authors recognised that paramedics' traditional in-house training focused mainly on pattern recognition rather than clinical reasoning and higher-order decision-making (Murdoch, 2019; Perona et al., 2019; Ryan & Halliwell, 2012). In 1995, the CAA produced the future scope of paramedic education document and developed the accreditation standards for higher education institutions (Grantham, 2004). The accreditation document aimed to describe what was required for a student to be road-ready and what attributes they should possess (Council of Ambulance Authorities Inc, 2024). The accreditation and subsequent documents now under the PBA guide

developing university programs to offer more in-depth education to the future paramedic workforce (Paramedicine Board of Australia, 2022).

Paramedics Australasia (PA) and the Australian and New Zealand College of Paramedicine (ANZCP) were both originally part of the Australasian College of Ambulance Professionals (ACAP), which was established to represent the professional interests of paramedics across Australia and New Zealand. In the early 2000s, a split occurred when the New South Wales Division separated and pursued a different strategic direction, leading to the formation of ANZCP, while PA continued as the successor to ACAP. Despite operating independently for several years, both organisations maintained a shared commitment to advancing the paramedic profession. In 2018, in response to national registration and with a shared vision for a unified voice, members from both PA and ANZCP voted in favour of a merger. This resulted in the formation of the Australasian College of Paramedicine (ACP), combining the strengths of both organisations to provide stronger representation and leadership for the profession across Australasia (Australian and New Zealand College of Paramedicine, 2016; Paramedics Australasia, 2014).

As discussed in this chapter, paramedics in Australia are now practising various skills across numerous clinical roles. Paramedicine is recognised as a distinct health profession, with paramedics required to possess a substantial amount of knowledge to effectively perform their duties (Thompson et al., 2015; Perona et al., 2019; Bell et al., 2021). In addition, the generalist role of a paramedic extends to include primary healthcare (O'Meara et al., 2015). Therefore, increasingly, paramedics are expanding their knowledge and skills, not just exclusively with specialist roles but also extending the traditional paramedic role (Eaton et al., 2021; Porter et al., 2020). However, the argument is that education has yet to keep up (Gent, 2016; Peate, 2015; Perona et al., 2019). Therefore, with an increase in the scope of practice and, ultimately, knowledge, the development of a formal curriculum guidance document that provides the cognitive ability, skills and expertise and highlights a clear career pathway that promotes up-to-date education to keep up with the demands of the changing role is essential (Leggio et al., 2021).

This chapter explored the historical and professional evolution of paramedicine in Australia, identifying key shifts from vocational training to higher education. It examined the impact of accreditation standards and the increasing complexity of

paramedic practice, including expanded roles in primary and community care. The regulatory framework and professional expectations have evolved significantly since national registration in 2018. However, the absence of formal curriculum guidance continues to create inconsistencies in aligning education with scope of practice. This highlights the need for structured frameworks that ensure education keeps pace with the expanding demands and responsibilities of the profession.

In conclusion, the national accreditation scheme plays a critical role in shaping the undergraduate paramedicine curricula in Australia. However, it must clarify whether it provides clear guidance on the knowledge and skills students must attain to meet the evolving profession. The scheme should inform the curriculum development process by ensuring that the curriculum is relevant, up-to-date, and aligned with the evolving demands of the profession.

2.3 VOCATIONAL AND UNIVERSITY PARAMEDICINE EDUCATION

Weber, A., Devenish, S., Lam, L. (2024). Vocational and university paramedicine education: Implications for professionalism. International Journal of Paramedicine. (7), 163–171. https://doi.org/10.56068/INTX9615. Retrieved from https://internationaljournalofparamedicine.com/index.php/ijop/article/view/3071.

This paper discusses paramedicine education in Australia, with a focus on diverse educational models and the evolution of accreditation standards. Over the last two decades, the paradigm of paramedicine education has undergone a significant shift, particularly towards a pre-employment model, shaping the trajectory of aspiring paramedics.

The roots of accreditation for paramedicine education in Australia can be traced back to remnants of vocational education and training (VET) and accredited training packages. The historical narrative includes the establishment of ambulance officer training centres in 1961, evolving from certificate-level qualifications to incorporate Diplomas and Advanced Diplomas. The transformative shift to the tertiary sector in the mid-to-late 1990s, spearheaded by Charles Sturt University, laid the foundation for

the current landscape of paramedic education across all Australian states and territories.

Accreditation responsibilities transitioned from the Council of Ambulance Authorities (CAA) and Paramedics Australasia to the Paramedicine Board of Australia (PBA) in 2018, coinciding with the initiation of paramedic professional registration. This pivotal shift has led to new accreditation standards emphasising professional competence and ethical behaviour, ensuring graduates are proficient in providing safe and effective care.

This section explores the global context of paramedicine education, highlighting the prevalence of degree programs in Australia, the United Kingdom, and New Zealand while contrasting them with the continued offering of diploma qualifications in countries such as Canada, the USA, and New South Wales in Australia. The ongoing international debate surrounding the effectiveness of vocational versus university education in preparing paramedics for professional practice adds a layer of complexity to the narrative.

Unlike Australasia, where paramedicine qualifications are integrated into higher education and regulated by national bodies without a national licensing exam, the United States and, similarly, Canada, operate under a more technical vocational pathway. In these systems, graduation from an accredited program does not automatically confer the right to practice. Instead, graduates must pass a national or state-based certification or licensure examination, such as the National Registry of Emergency Medical Technicians (NREMT) exam in the U.S. This examination acts as a gatekeeper to professional practice and has a direct impact on the perceived quality and accountability of educational providers. As such, accreditation bodies in these countries often use exam performance data as a key measure of program effectiveness. Including this detail in the original publication would have provided greater clarity for international readers unfamiliar with this system.

The dichotomy between the Diploma of Paramedical Science and Bachelor of Paramedic Science degree programs is explored in the Australian context. While the latter is mandated for ambulance recruits in all Australian states for registration with the PBA and the Australian Health Practitioner Regulation Agency (Ahpra), the former serves as a pathway for those wishing to work in the private sector or pursue university education for professional registration. The potential ambiguity in messaging,

especially from NSW Ambulance, raises questions about how vocational education aligns with the rigorous accreditation standards set by the PBA.

The chapter extends beyond the regulatory aspects, delving into the intrinsic value of education in paramedicine. It highlights the fundamental role of degree programs in fostering personal and professional growth and equipping individuals with critical thinking and effective communication skills. The transformative journey from classrooms to workplaces is explored, emphasising the role of education in shaping a future workforce committed to continuous learning and ethical conduct.

Furthermore, the chapter explores the symbiotic relationship between education and professionalism, emphasising how a well-rounded education cultivates a culture of ethical conduct and integrity. The importance of transferable skills, including adaptability and collaboration, is underscored as integral components of comprehensive education in the dynamic global workforce.

As the narrative unfolds, the chapter sets the stage for a comprehensive examination of the various educational pathways available to aspiring paramedics. It examines the development of accreditation standards and emphasises the critical importance of maintaining high levels of professional competence and ethical behaviour to produce graduates capable of navigating the complexities of the paramedicine profession with confidence and efficacy.

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SPECIAL REPORT

VOCATIONAL AND UNIVERSITY PARAMEDICINE EDUCATION: IMPLICATIONS FOR PROFESSIONALISM

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ABSTRACT

This paper highlights key research areas within paramedicine education in Australia. Firstly, it discusses the need for a comparative analysis of accreditation standards, focusing on the recent shift towards a pre-employment model and its impact on program content, particularly the balance between theoretical and practical components. Secondly, it addresses the importance of exploring the influence of ethics education on paramedic practice, investigating how a robust ethical foundation acquired during education translates into ethical practices in real-world scenarios. Additionally, it suggests conducting a comparative study of international models to understand different education approaches, emphasizing the importance of identifying best practices to enhance paramedic education in Australia. Lastly, it emphasizes the significance of assessing the impact of accreditation changes in 2018, specifically the shift in accreditation responsibilities from the Council of Ambulance Authorities to the Paramedicine Board of Australia, aiming to understand its implications on the quality and consistency of paramedicine education across various institutions. Overall, this paper highlights the critical research gaps and areas of investigation essential for advancing paramedicine education and improving the quality of paramedic training in Australia.

INTRODUCTION

This review article delves into the diverse education models for paramedicine in Australia, exploring the evolution of accreditation standards and the historical transition towards a pre-employment model over the past two decades. The accreditation process for paramedicine education in Australia has been shaped by remnants of vocational education and training (VET) and accredited training packages, with ambulance services initially establishing ambulance officer training centers (AOTCs) in 1961(Brooks et al., 2018). These centers initially offered qualifications ranging from certificate level to an Associate Diploma, which expanded over subsequent decades as ambulance services became registered training organizations (RTOs). The shift towards tertiary education began in the mid to late 1990s, led by Charles Sturt University (Lord, 2003), and expanded across all

Australian states and territories in the early to mid-2000s. Accreditation of tertiary paramedic programs was initially overseen by the Council of Ambulance Authorities (CAA) and Paramedics Australasia, with responsibility later transferred to the Paramedicine Board of Australia (PBA) in 2018 (AHPRA, 2022).

While degree programs are the norm in Australia, the United Kingdom, and New Zealand, diploma qualifications still exist in countries like Canada and the USA. The Diploma of Paramedical Science in Australia is a pathway for private-sector ambulance technicians or a steppingstone towards professional registration through further university education. However, the continued offering of the Diploma of Paramedical Science by NSW Ambulance alongside degree programs raises questions about consistency in education standards and accreditation (Lazarsfeld et al., 2011).

The paper also discusses the role of education in fostering professionalism and personal growth, emphasizing the acquisition of essential skills and knowledge necessary for success in the dynamic field of paramedicine. It underlines the importance of maintaining high standards of professional competence and ethical conduct to ensure the delivery of safe and effective care by graduates.

In summary, this paper provides an insightful examination of paramedicine education in Australia, tracing its historical development and exploring the implications for professionalism within the field.

HISTORICAL TRAJECTORY OF ACCREDITATION

The establishment of Ambulance Officer Training Centers (AOTCs) in 1961 marked a significant milestone in the history of paramedic education, ushering in an era focused on providing rigorous training for aspiring ambulance officers (Brooks et al., 2018). These centers played a pivotal role in shaping the competencies and skillsets necessary for the burgeoning profession, adapting qualifications to meet the evolving demands of healthcare and emergency services (Brooks et al., 2018).

Vocational Education and Training (VET) principles influenced the development of accreditation standards, guiding the structure of paramedic education and ensuring adherence to standardized benchmarks (Brooks et al., 2018). The transition to accreditation under the Paramedicine Board of Australia (PBA) further solidified the regulatory framework, with the PBA and predecessor bodies like the Council of Ambulance Authorities (CAA) and Paramedics Australasia playing key roles in shaping accreditation standards (Brooks et al., 2018).

As conceptualized by Freiberg, regulatory theory offers a multifaceted perspective on regulation, which resonates with the pragmatic approach needed to contextualize regulation within the paramedic profession (Freiberg, 2010). The regulatory landscape for paramedics involves a hybrid model combining elements of self-regulation by the profession and legislative requirements imposed through the National Scheme by the Australian Health Practitioner Regulation Agency (AHPRA).

The National Scheme, established by the Health Practitioner Regulation National Law Act 2009, provides a unified framework for regulating health professions across Australia (AHPRA, 2022). Accreditation schemes have emerged as vital tools for ensuring

the quality of paramedic education, allowing institutions to measure their performance against established competencies or domains (AHPRA, 2022).

The journey of paramedic education from the inception of AOTCs to the current regulatory landscape reflects the profession's dedication to excellence and adaptation (Brooks et al., 2018). As paramedicine continues to evolve, ongoing research and evaluation will be essential to ensure that education remains responsive to the demands of the field, preparing graduates to excel in their roles (FitzGerald & Bange, 2015).

Within paramedicine education, the correlation between program accreditation and graduates' performance on board examinations has garnered significant attention. A thorough examination of existing literature sheds light on crucial insights into this correlation.

Initial findings suggest that program accreditation plays a pivotal role in shaping graduates' success rates on the National Registry Paramedic Certification Examination. A study investigating this correlation revealed a substantial advantage for students who underwent training in accredited programs. Specifically, attendees of accredited programs exhibited a notable odds ratio of 1.65 for passing the examination, indicating a robust positive link between accreditation status and examination performance (Dickison et al., 2006).

COMPARISON OF VOCATIONAL AND UNIVERSITY EDUCATION

The ongoing debate between vocational and university education in preparing paramedics for professionalism underscores the need for a nuanced understanding of their strengths and limitations (Hickson et al., 2015). Vocational paramedicine education, often provided by technical and vocational schools, focuses on hands-on experience and practical skills, aiming to produce work-ready paramedics efficiently (Nolan, 2023). Despite its advantages in shorter study durations and lower tuition costs, vocational education has been criticized for its perceived lack of academic rigor and theoretical knowledge, potentially hindering future safe practice (Ferm, 2021).

On the contrary, university paramedicine education prioritizes theoretical knowledge, research skills, and critical thinking, aiming to develop leaders in the field (Bell et al., 2020). Recognized as a prerequisite for professionalism, university programs offer a comprehensive curriculum and prepare students for leadership roles (Weber et al., 2024; International Organisation for Standardisation, 2020). However, concerns about the potential lack of practical experience and hands-on training in university education exist, although simulation-based education can mitigate these concerns (Miles et al., 2020; Hickson et al., 2015).

The effectiveness of both vocational and university education lies in their emphasis on practical skills and theoretical knowledge, respectively. Vocational education provides real-world experiences, while university education offers a more comprehensive understanding of patient care. Combining both approaches or adopting a hybrid model could potentially produce well-rounded and competent paramedics capable of meeting the evolving demands of the profession (Bell et al., 2020; Munro et al., 2019).

In Australia, bridge programs do exist in paramedicine education, offering vocational paramedics the opportunity to obtain a degree. These programs are designed to facilitate the transition from a vocational level to a degree level in paramedicine. They aim to recognize the experience and skills gained through vocational training while providing additional academic coursework to meet the requirements for a degree.

Bridge programs typically offer a pathway for vocational paramedics to earn credits for their prior learning and experience, which can then be applied toward the completion of a degree. This may involve a combination of credit transfer, recognition of prior learning (RPL), and additional coursework to meet degree requirements.

LINK BETWEEN EDUCATION AND PROFESSIONALISM

Paramedicine education is pivotal in shaping future professionals and is closely intertwined with professionalism (Hill & Eaton, 2023). Educational institutions serve as the guiding force in developing a paramedic's professional identity, providing the foundation upon which professionalism is built.

Acquiring clinical knowledge is paramount to linking education and professionalism (Reed et al., 2019). Paramedicine education encompasses a thorough understanding of anatomy, physiology, pharmacology, and medical procedures, enabling paramedics to make informed decisions during emergencies and effectively assess patient needs.

Ethics and professionalism are also central to paramedicine education, with institutions emphasizing ethical conduct, empathy, and communication (Townsend, 2017). This focus on values shapes the professional identity of paramedicine graduates and contributes to the overall professionalism of the field.

The transition from classrooms to workplaces is transformative for paramedicine students, marked by a shift from theoretical knowledge to practical application (Page et al., 2021; Sandy et al., 2021). Clinical placements and simulated scenarios provide hands-on experience, bridging the gap between theory and practice and enhancing competence and confidence in paramedic roles.

Educational institutions facilitate this transition by designing curriculum structures incorporating practical training, simulation exercises, and clinical placements (Alrazeeni et al., 2021). Experiential learning enhances students' ability to apply theoretical knowledge in dynamic situations, contributing significantly to their professionalism.

Furthermore, educational institutions nurture qualities such as teamwork, communication, and adaptability—essential traits for successful paramedics (Mulholland et al., 2019). Collaborative skills enable paramedics to work effectively within multidisciplinary healthcare environments, enhancing their professionalism.

Curriculum design reflects the evolving nature of healthcare, with institutions regularly updating programs to incorporate advancements in paramedicine (O'Meara et al., 2014). This ensures graduates have the latest knowledge and skills, enhancing their professionalism and adaptability to changing healthcare landscapes.

In addition to technical competence and ethical considerations, education instils a commitment to ongoing professional development (Law & Hui, 2020). Paramedicine students

are encouraged to engage in lifelong learning, staying updated on research, protocols, and technologies to maintain professionalism throughout their careers.

ETHICAL FOUNDATION AND PROFESSIONALISM

Education is the cornerstone for fostering a culture of professionalism in any field, particularly in professions like paramedicine, where ethical conduct, integrity, and a strong work ethic are paramount (Shearer et al., 2021). Accreditation for paramedicine education in Australia provides a contextual backdrop for understanding these concepts, highlighting the various educational pathways available for aspiring paramedics.

Professionalism in paramedicine encompasses a range of attitudes, behaviors, and skills essential for competent and ethical practice (Cao et al., 2023). A baccalaureate degree in paramedicine is expected to instill a foundation in ethics, crucial for meeting the professional requirements of registered paramedics (Shearer et al., 2021). Education programs for paramedics are designed to impart technical skills while nurturing a sense of responsibility, ethical awareness, and a commitment to maintaining integrity (Townsend & Luck, 2022).

Ethical considerations are integral to paramedicine, where rapid clinical judgment often impacts patient outcomes (Shearer et al., 2021). Education equips paramedics with the ethical framework for navigating complex scenarios, emphasizing patient autonomy, beneficence, non-maleficence, and justice (Shearer et al., 2021). Paramedic students engage in case studies, simulations, and ethical discussions to develop critical thinking skills for making sound ethical decisions under pressure (Andersson et al., 2022).

A strong work ethic is fundamental in the demanding field of paramedicine, where long hours, high-stakes situations, and unpredictable challenges are routine (Diamond & Bilton, 2021). Paramedicine education programs incorporate rigorous training to prepare students for the realities of the job, instilling discipline and resilience essential for thriving in such environments. This training reinforces the importance of diligence and commitment to excellence.

The development of accreditation for paramedicine education in Australia underscores the profession's commitment to maintaining high standards. Accredited university programs and vocational education and training (VET) courses offer diverse pathways for aspiring paramedics, guided by accreditation standards that emphasize ethical conduct, integrity, and a strong work ethic. These programs play a crucial role in shaping the future generation of paramedics by fostering a culture of professionalism through comprehensive education.

INTEGRATION OF EDUCATION AND PROFESSIONALISM

The symbiotic relationship between education and professionalism is evident, as education lays the foundation for knowledge and skills, while professionalism channels these attributes into effective and ethical actions, fostering holistic personal and professional growth.

Education provides the theoretical framework and intellectual capacity to understand complex concepts, fostering continuous learning and adaptability. Professionalism en-

sures individuals apply their knowledge with integrity and responsibility, positively contributing to their workplaces and society.

Higher education emphasizes theoretical understanding, critical thinking, and research abilities, preparing individuals for diverse professional opportunities. Vocational education focuses on practical skills and hands-on training, equipping individuals with technical expertise for specific roles.

A balanced approach integrates theoretical knowledge with practical skills, preparing individuals for diverse opportunities and fostering adaptability and commitment to excellence. This integration remains crucial for personal and societal progress in an evolving global landscape.

The paper explores the changing landscape of paramedicine education in Australia, focusing on accreditation development and diverse educational pathways. Vocational programs emphasize hands-on experience, producing workforce-ready paramedics efficiently. However, criticism arises regarding academic rigor and theoretical knowledge deficiencies, impacting critical decision-making abilities.

University programs emphasize theoretical knowledge and research skills, preparing students for leadership roles. Concerns include a potential lack of practical experience addressed through simulation-based education. A balanced approach, integrating theoretical knowledge with practical skills, ensures paramedics are well-equipped for the complexities of modern practice.

CONCLUSION

In conclusion, this study underscores the profound interconnection between education and professionalism within paramedicine, delineating the nuanced distinctions between higher education and vocational training. Recognizing their associated relationship is pivotal, extending beyond academic realms to encompass critical thinking skills, research acumen, and practical competencies.

Integral to individual and societal progress in paramedicine is integrating education and professionalism, addressing contemporary demands, and acknowledging the field's evolving nature. As paramedicine advances, the need for highly educated professionals becomes increasingly paramount, requiring individuals equipped to navigate its complexities.

Considering these findings, higher education is better positioned to offer a comprehensive and balanced approach than vocational education. Integrating theoretical knowledge with practical skills seamlessly surpasses the traditional dichotomy between academic and vocational pathways. Higher education uniquely prepares individuals for diverse professional opportunities within paramedicine, instilling adaptability, ethical grounding, and a commitment to excellence.

This paper thoroughly examines paramedicine education accreditation in Australia, detailing diverse educational routes for aspiring paramedics. Emphasizing the significance of upholding professional competence and ethical conduct, it highlights the transformative potential of higher education in shaping proficient and adaptable paramedicine professionals for the complex and dynamic future of the field.

RECOMMENDATIONS

The paper identifies several areas for potential research within paramedicine education in Australia. One notable area involves conducting a comparative analysis of accreditation standards. This research would evaluate how the recent shift towards a pre-employment model influences program content, particularly in balancing theoretical and practical components. Additionally, it aims to assess the impact of accreditation standards on the overall quality of paramedic education.

Another area of investigation could focus on the impact of ethical education on paramedic practice. Researchers would explore how ethics education within paramedicine programs shapes paramedics' decision-making processes and professional conduct. This inquiry seeks to determine whether a robust ethical foundation acquired during education translates into ethical practices in real-world scenarios.

A comparative study of international models could provide comprehensive insights into paramedicine education. This research will concentrate on countries with healthcare systems similar to Australia's, examining the strengths and weaknesses of different education models, especially concerning the balance between theoretical and practical components. Identifying best practices from international models could enhance paramedic education in Australia.

Additionally, assessing the impact of accreditation changes in 2018, specifically, the shift in accreditation responsibilities from the Council of Ambulance Authorities to the Paramedicine Board of Australia is crucial. This investigation would determine how this change has influenced the quality and consistency of paramedicine education across various institutions, offering valuable insights for ongoing improvements in the accreditation process.

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2.3.1 Summary of Findings

The findings presented in the article *Vocational and University Paramedicine Education – Implications for Professionalism: A Conceptual Discussion* highlight key research areas within paramedicine education in Australia. Specifically, the paper examines the impact of shifting towards a pre-employment education model and the balance between theoretical and practical components in curricula. Additionally, it explores international education models to identify best practices and assesses the implications of the 2018 accreditation changes, including the transition of accreditation responsibilities to the Paramedicine Board of Australia. These findings underscore the crucial connection between education and professionalism, laying a foundation for understanding and refining paramedic training and practice.

This article contributed to the exploration of Objectives One, Two, Three and Four of this thesis by identifying key research gaps in paramedicine education, particularly around accreditation, curriculum design, ethics education, and international comparisons. The findings underscore the significance of comprehending the educational framework in paramedicine, notably the transition from traditional vocational training to higher education. This shift signifies the evolution of paramedic practice and the acknowledgment of the need for professionals with a broader skill set, encompassing critical thinking, research abilities, and practical competencies. It suggests that the historical trajectory of paramedicine education in Australia has moved towards a more comprehensive and balanced approach, aligning with global trends towards professionalisation in healthcare.

The recommendation to compare accreditation standards with those of other jurisdictions provides insight into Australia's paramedicine education framework in relation to international models. This evaluation can shed light on areas of strength and areas for improvement, facilitating knowledge exchange and the potential adaptation of best practices from other countries.

The findings emphasise the importance of integrating theoretical knowledge with practical skills in paramedicine education. This suggests that current educational programs in Australia are designed to provide a well-rounded learning experience that prepares students for the complexities of the profession. However, the recommendation to explore the impact of ethical education on paramedic practice indicates a potential area for further development and evaluation of curricula.

The emphasis on the transformative potential of higher education in shaping proficient and adaptable paramedicine professionals suggests a theoretical basis for future practice and curriculum development. This involves recognising the field's evolving nature and the need for ongoing adaptation and improvement in educational programs. Additionally, the recommendation to assess the impact of accreditation changes in 2018 reflects a commitment to continuous quality improvement in paramedicine education.

In conclusion, this paper has highlighted key research areas within paramedicine education in Australia, emphasising the critical need for a balanced approach to theoretical and practical components, a robust foundation in ethics, and a thorough understanding of the implications of recent accreditation changes. The comparative analysis of international education models offers valuable insights into best practices, which can enhance the quality and consistency of paramedic training in Australia. As paramedicine continues to evolve, addressing these research gaps is essential for advancing paramedicine education and improving the quality of paramedic training.

The insights gained from this chapter provide a critical foundation for the broader examination of paramedicine education presented in this thesis. By identifying key research gaps—such as the balance between theoretical and practical learning and the impact of accreditation changes—this discussion informs the need for a structured and evidence-based approach to curriculum development. With this background established, Chapter Three transitions to the methodological framework guiding this study, detailing the multi-modal research approach used to investigate the influence of the Australian Paramedicine National Accreditation Scheme on curriculum design in higher education institutions.

Chapter 3: Research Design

3.1 INTRODUCTION

Chapter Two provided a comprehensive review of the historical development of paramedicine, along with an in-depth analysis of key themes in the literature. This included the evolution of prehospital care in Australia, the preparation of paramedic education to meet the expanding scope of paramedicine, and the accreditation processes that shape the profession. Building on these robust foundations, Chapter Three outlines the research methodology adopted for this multi-modal study, exploring how the Australian Paramedicine National Accreditation Scheme impacts curriculum design in higher education institutions.

This chapter details the research problem, research questions, and methodological approach employed in this study. It also outlines the research design, population, data sources, data collection and analysis methods, as well as ethical considerations and limitations. Notably, this chapter establishes a foundation for coherent and meaningful inquiry into the accreditation-driven evolution of paramedic education in Australia by ensuring a strong alignment between the research objectives and methodology.

This study aims to investigate the impact of accreditation on curriculum design, particularly in the context of the evolving scope of paramedic practice. The literature acknowledges that paramedicine is undergoing significant change, as indicated by the works of the Australasian College of Paramedicine (2024), Petschack et al. (2023), and Agarwal et al. (2022). In 2001, the Council of Ambulance Authorities (CAA) established an interim Australian Education Committee (AEC) to propose external accreditation for university paramedic courses. By 2004, the AEC formally developed this accreditation process, leading to the CAA's publication of Guidelines for the Assessment and Accreditation of Entry-level Paramedic Education Programs and the Paramedic Professional Competency Standards Development Report in 2010. Building on these efforts, Paramedics Australasia (PA) introduced the Australasian Competency Standards for Paramedics in 2011 to support consistent curriculum design and accreditation. Despite these advances, however, curricular diversity among

paramedic education providers remained, as evidenced by Hou et al. (2013). While the Professional Capabilities for Registered Paramedics, established by the Paramedicine Board of Australia (PBA), aims to standardise educational outcomes, a noticeable gap in recent literature acknowledges the ongoing variability in curricula (Weber et al., 2021).

Further complicating this issue is the information identified in the literature. O'Meara et al. (2017) argued that paramedic education focuses on current practice with limited foresight into the profession's future needs. Although the study by Worsfold., et al. (2024) emphasises effective relationships within contemporary learning frameworks, it does not indicate a forward-looking approach to future paramedic roles for evolving healthcare contexts. Therefore, the focus of contemporary paramedic education may remain unchanged. To fully grasp the dynamics shaping the field, it is necessary to comprehensively evaluate the educational, regulatory, and professional frameworks underpinning paramedicine in Australia and to compare these with international models. Understanding the theoretical foundations of current educational programs and their practical application through curricula is crucial for addressing the complexities of curriculum design under national accreditation standards.

3.2 STATEMENT OF THE PROBLEM

The transition of paramedicine from a vocational training model to requiring a university degree for registration has significantly advanced the education and professionalisation of paramedics. However, despite these advancements and the implementation of national regulatory frameworks, such as the National Registration and Accreditation Scheme (NRAS) and the Paramedicine Accreditation Committee (PAC), a gap remains in understanding how these regulatory standards influence the design and delivery of paramedicine curricula. The evolving role of paramedics—now extending beyond emergency care to include primary healthcare and public health responsibilities—necessitates curricula that not only address current practices but also prepare graduates for the profession's future demands (Australasian College of Paramedicine, 2024; O'Meara et al., 2017). Existing accreditation standards may not fully capture or address these broader, more complex roles, potentially leaving paramedics underprepared for the realities of their evolving profession (Agarwal et al., 2022).

Although national benchmarks for paramedic education have been established through professional capabilities and program accreditation standards, there remains notable variation in how these have been applied across higher education institutions nationally and internationally for many years. This inconsistency results in differing levels of graduate preparedness (Hou et al., 2013). Worsfold et al. (2024) discuss the shift toward bachelor's degree requirements as part of the evolution in paramedic education to meet current practice demands; however, this level of qualification may still fall short of equipping graduates for future professional needs. The persistence of diverse curricula raises concerns regarding the alignment of paramedic education with current and future professional practice requirements (Petschack et al., 2023). Furthermore, limited research exists on the practical impacts of these accreditation standards on educational outcomes and the clinical competencies of graduates.

Given the expanding and increasingly complex role of paramedics in modern healthcare, there is an urgent need to evaluate whether current university curricula adequately prepare graduates for the realities of professional practice. Without such evaluation, there is a risk that graduates may enter the workforce without the necessary competencies to manage complex clinical situations, work effectively across multidisciplinary healthcare settings, or contribute to system-level goals such as improving patient outcomes, reducing hospital admissions, and delivering cost-effective care. This study addresses these gaps by examining how the Australian Paramedicine National Registration and Accreditation Scheme shapes curriculum design in higher education institutions. It aims to determine whether these curricula reflect the expanding scope of paramedic practice. By exploring the intersection of accreditation, curriculum design, and professional practice, this research aims to gain a deeper understanding of the factors influencing paramedic education and the preparedness of graduates, ultimately enhancing patient outcomes.

3.3 RESEARCH QUESTION

My PhD research is driven by the need to evaluate whether the current and evolving scope of paramedic practice is sufficiently addressed in undergraduate paramedicine curricula. Central to this inquiry is the influence of the Australian Paramedicine National Registration and Accreditation Scheme on curriculum design and how accredited programs prepare paramedics for the expanding demands of the profession. To address the complexity of the research question, this study adopts a

multi-modal approach to explore the relationship between accreditation standards and curriculum development in paramedic education. Rather than solely framing the study as multi-modal, it integrates diverse methodologies, including qualitative research, systematic reviews, content analysis, and the Delphi technique, to comprehensively investigate the multifaceted aspects of paramedicine accreditation.

The multi-modal approach employed in this research offers several significant advantages, enhancing the depth and reliability of the findings. By incorporating multiple methods, triangulation strengthens the accuracy and credibility of the results through cross-validation, reducing potential biases and ensuring a well-rounded analysis. This approach also facilitates the identification of correlations, revealing patterns and relationships between accreditation standards and curriculum development that might remain unnoticed with a single-method approach. Furthermore, it enables the inclusion of diverse perspectives, capturing the insights of various stakeholders such as educators, accrediting bodies, and practitioners, thereby providing a holistic understanding of the research problem. Lastly, this comprehensive approach enhances generalisability, extending the findings beyond the immediate study context and offering broader implications for paramedic education in various settings.

The literature supports the value of this approach. According to Doyle et al. (2020), multi-modal methods in healthcare research offer a comprehensive understanding of specific phenomena and serve various purposes. They can function as an independent research design, lay the groundwork for more extensive qualitative studies, or often serve as the qualitative component within mixed-methods research. This study builds on this perspective by integrating multiple qualitative and quantitative techniques to capture the complexities of paramedic education.

By employing this multimodal approach, the study addresses the intricate interplay between accreditation standards and curriculum development, contributing to broader educational and professional discussions in paramedicine.

Research Objectives

Four key research objectives guide the study:

Objective one: Describe the history and current status of paramedic practice in Australia, along with the educational, regulatory, and professional frameworks that support it.

This objective aims to provide a foundational understanding of the evolution of paramedicine, setting the context for subsequent analysis.

Objective Two: Evaluate the Australian paramedic framework by comparing it with those in other jurisdictions.

This objective aims to highlight the strengths and weaknesses of the Australian framework of international standards and practices through a comparative analysis.

Objective Three: Examine the theoretical foundations of current educational programs and their implementation within curricula.

This objective focuses on assessing the theoretical underpinnings of paramedic education, ensuring that current programs align with educational standards and professional expectations.

Objective Four: Develop a theoretical framework for future practice, policy, and practical applications in paramedicine.

This objective aims to provide a forward-looking perspective, identifying gaps and opportunities for enhancing paramedic education and practice in light of emerging healthcare needs.

Primary Research Question

To guide the investigation, the primary research question is:

How does the Australian Paramedicine National Registration and Accreditation scheme prepare paramedic graduates for the evolving scope of paramedicine practice?

Sub-Questions

In line with the primary research question, three sub-questions have been formulated:

Question One: What has been the historical evolution of paramedicine in the Australasian region?

This question aims to trace the development of paramedicine, providing context for understanding current practices and educational frameworks.

Question Two: What key trends are currently influencing the clinical practice of paramedicine in Australasia?

This question identifies significant factors affecting paramedic practice, enabling a nuanced analysis of educational and professional needs.

Question Three: In what ways does higher education contribute to meeting the evolving professional requirements of paramedicine?

This question explores the role of higher education in preparing paramedic graduates for contemporary and future challenges in the healthcare landscape. As accreditation requirements evolve, educational institutions face the challenge of balancing the need to produce competent graduates ready for specific roles, such as those within a particular ambulance service, against the broader demands of the paramedicine profession. This shift raises critical questions about the primary purpose of university education in this field.

These research questions aim to investigate how accreditation frameworks influence curriculum design and whether they ensure that graduates are adequately prepared for both current and future paramedic practice. By exploring these areas, this study aims to identify necessary improvements and provide recommendations for future curriculum development that better aligns with the professional realities of paramedicine in Australia.

3.4 QUALITATIVE RESEARCH

A comprehensive research design incorporates rigorous data collection methods and detailed insights into data gathering. As Wohlin and Aurum (2014) advocate, such studies often blend established methodologies. While qualitative research offers various approaches, aligning research inquiries with the chosen qualitative design is pivotal. While this study is grounded in a constructivist paradigm, it also incorporates a pragmatic approach to methodological choices. That is, rather than rigidly adhering to one fixed method, decisions were made based on what would best serve the research objectives and context. Agee (2009) emphasised the importance of researchers justifying their chosen design, whether qualitative, quantitative, or mixed-methods, and ensuring it aligns with the nature of the research questions. Jean Lee (1992) similarly argued that methodological decisions should be shaped by the research aims

and participant groups. This pragmatic flexibility complements the constructivist and critical theoretical perspectives underpinning the study.

Qualitative research is particularly well-suited for describing, evaluating, and developing theoretical frameworks because it allows for in-depth exploration and understanding of complex phenomena. Document analysis will enable researchers to gather rich, detailed descriptions of the history, current status, and various aspects of paramedicine practice in Australia. Through open-ended questioning and exploration, researchers can capture nuanced perspectives, experiences, and contextual factors contributing to a comprehensive understanding of the paramedicine curriculum.

Researchers can critically examine and evaluate the effectiveness of the paramedicine framework compared to other jurisdictions outside Australia by employing comparative case studies or thematic analysis. This approach identifies strengths, weaknesses, challenges, and opportunities within the framework, leading to a deeper understanding of the factors that influence its effectiveness. Gathering diverse viewpoints and experiences further enhances this understanding, facilitating a comprehensive evaluation of the framework.

In conducting research, a combined approach of describing and evaluating can be employed to examine the theoretical basis of current educational programs and their application through curricula. Through this approach, researchers examine how theoretical concepts are applied in practice, how they inform educational strategies, and how they are perceived and experienced by stakeholders, including educators, students, and practitioners.

Qualitative methodologies support the development of theoretical frameworks in research. These methodologies offer insights, perspectives, and interpretations that can inform the conceptualisation of future practices, accreditation processes, and curriculum development. Through techniques such as thematic analysis, conceptual mapping, or grounded theory approaches, researchers can identify emergent themes, patterns, and theoretical constructs that contribute to the evolution of new theoretical frameworks or the refinement of existing ones.

Qualitative research methodology is particularly appropriate when investigating complex phenomena from the perspectives of those involved. In examining the impact of accreditation on curriculum development, Song, Kim, and Park (2021) suggest that

a qualitative approach is appropriate. This paper presents a research design that enables the investigation of the perspectives of paramedicine academics on curriculum development, utilising a multimodal methodology. This approach enables researchers to gain a deeper understanding of the phenomenon under investigation, identifying meaningful themes and patterns in the collected data through consensus (Song et al., 2021).

Qualitative research is an approach that emphasises the understanding and interpretation of the underlying meaning and intentions of human interaction (Zohrabi, 2013). In this approach, the researcher serves as the primary data collection instrument, collecting and recording data, which is then followed by analysis and interpretation (Snyder, 2019). While Grounded Theory (GT) treats all forms of information as data for theory development, other qualitative methods, such as literature reviews, focus on investigating, integrating, and disseminating existing findings to build a foundation for further research (Snyder, 2019).

Qualitative research methods are increasingly recognised for their ability to uncover deep insights within large datasets, particularly in understanding shared patterns, evolving collective behaviours, and aligning findings with research objectives. Qualitative methods can enhance the interpretation of quantitative data from large cohort studies, generating novel hypotheses and insights that may be overlooked by standard quantitative approaches (Nguyen et al., 2023).

3.4.1 Importance of Literature Review in Qualitative Research

Creswell and Creswell (2018) indicate that literature in qualitative research is specific to critical theory development and is introduced early within studies as an alignment framework. As outlined previously, this thesis incorporates the conceptual framework of Critical Theory.

Multi-modal research emphasises understanding phenomena from participants' perspectives, enabling the researcher to capture and interpret lived experiences and contextual factors in depth. This approach is well-supported by a thorough literature review, establishing a foundation for exploring the study's themes and guiding conceptual frameworks (Creswell & Poth, 2018). This study's literature review provides essential context for understanding paramedicine education and accreditation, establishing a clear link between existing research and the study’s

objectives, which are grounded in Critical Theory. Critical Theory is introduced early in this research as a conceptual framework for exploring power dynamics, institutional standards, and their impact on paramedic education and practice.

Identifying Gaps and Connecting Themes

Literature reviews are essential in multi-modal research as they help identify previous findings, reveal gaps, and connect disparate topics to form a cohesive framework for analysis (Snyder, 2019). By synthesising existing knowledge, the literature review in this study not only highlights areas of consensus and divergence but also provides a roadmap for further inquiry, setting the stage for exploring how accreditation standards influence the preparedness of paramedic graduates for evolving professional roles. Conceptual frameworks, such as Critical Theory, are typically outlined before data collection but may adapt as insights emerge, thereby enhancing the flexibility and depth of qualitative research (Creswell & Poth, 2018).

In multi-modal research, aligning the literature review with the study's framework strengthens the coherence of the analysis by situating participants' perspectives within broader theoretical and contextual narratives. This process allows the research to delve deeply into the underlying dynamics of paramedicine education and accreditation, revealing how current standards shape professional practice in a continually evolving field.

Creswell & Creswell (2018) also noted that qualitative researchers use the literature as a learning tool rather than explicitly addressing a research question. Qualitative research utilises various methodologies to examine ‘the what and how of decision-making’ (Creswell & Creswell, 2018). The use of literature reviews in supporting qualitative studies is often because the researched topics have not been previously studied; therefore, the researcher requires a foundational understanding (Creswell & Creswell, 2018).

In qualitative research, a literature review plays a crucial role in identifying gaps in existing knowledge, thereby establishing the foundation for new insights and potential theoretical developments. By examining prior studies, the literature review in this thesis reveals areas where research on paramedicine education and accreditation is limited or fragmented, allowing this study to address these gaps. Furthermore, aligning the literature with the study's critical theoretical framework, as suggested by

Creswell and Creswell (2018), ensures that the research questions are situated within a broader context that critically examines the influence of power structures on professional practice. This alignment clarifies the study's purpose, enhancing the potential for new perspectives and theories to emerge from the analysis (Lauridsen & Higginbottom, 2014).

3.5 RESEARCH METHODOLOGY

An effective research design combines rigorous data collection methods with a thorough understanding of the data-gathering process. According to Wohlin and Aurum (2014), successful studies often integrate multiple established methodologies. It is essential to align research questions with the chosen qualitative approach in qualitative research. Embracing a pragmatic perspective allows for flexibility in the research process, enabling adjustments to methodologies as needed to address the evolving nature of the inquiry. Ultimately, researchers are responsible for justifying their chosen design, as Agee (2009) emphasised. They must discern whether a qualitative, quantitative, or mixed-methods approach is most suitable. The relationship between research methodology and the formulation of research questions is complex and multifaceted. Jean Lee (1992) argues that the research methodology can shape both the research question and the targeted participant group, suggesting that the choice of methodology influences the direction and focus of the inquiry. Conversely, it can also be argued that the research question informs the choice of methodology, guiding researchers in selecting appropriate methods to address their inquiries effectively. Thus, understanding this interplay is crucial for designing a robust research framework that effectively aligns methodology with research objectives.

This study employs a multimodal research methodology to explore how accreditation standards influence the development of paramedicine curricula in Australia. A qualitative approach was selected as the most appropriate method for addressing the research sub-questions, which aim to uncover the nuanced experiences and perceptions of key stakeholders, review the evolution of paramedicine in the Australasian region, the key trends impacting clinical practice, and the specific role of higher education in meeting professional requirements. According to Merriam and Tisdell (2016), qualitative research is particularly well-suited for understanding complex phenomena, as it relies on rich, descriptive data gathered through interviews, observations, and document analysis.

The philosophical approach guiding qualitative multi-modal research methodology is constructivism. Constructivism posits that knowledge is constructed through social interactions and experiences, making it an appropriate paradigm for exploring educational practices, standards, and stakeholder perspectives within medical education (Kim, 2020). It also includes paramedicine education.

Building on the philosophical foundation, the methodology is guided by a Conceptual Framework anchored in Critical Theory. This theoretical perspective examines power structures, hierarchies, and the impact of accreditation standards on curriculum design and professional practice (Kress, 2011), enabling a critical analysis of how these standards influence graduates' preparedness for an evolving scope of paramedic practice in Australia.

The Contextual Framework provides specificity to the study, focusing on Paramedicine Education, Accreditation, and the Scope of Practice. These elements contextualise the research, linking the national registration and accreditation standards, as well as curriculum design, to the professional scope of paramedics in Australia.

The multi-modal approach is particularly effective in exploring how the Australian Paramedicine National Registration and Accreditation Scheme prepares paramedic graduates for the evolving scope of paramedicine practice. While qualitative descriptive research is well-suited for capturing phenomena clearly and straightforwardly, integrating multiple methodologies in this study allows for a more comprehensive examination of how accreditation frameworks influence paramedicine curricula. This approach provides a richer understanding of how these frameworks align with current and future practices.

While Bradshaw, Atkinson, and Doody (2017) assert that qualitative description effectively explores practical, real-world issues in detail, a multimodal approach offers a more comprehensive way to address the complexities of research questions such as those examined in this study. Designing for multimodal data inevitably involves integrating a mix of methods, requiring careful attention to how findings from these different methodologies are synthesised into cohesive conclusions (Bazeley, 2022). This approach goes beyond traditional qualitative description by ensuring that specific attention is paid to defining cases and samples to maximise the integration of varied data. Moreover, planning for integrative analysis strategies allows for a more nuanced

and holistic report that reflects the richness of diverse data sources, providing a deeper and more comprehensive understanding of the research problem.

3.5.1 Justification for Multimodal Approach Methodology

The multi-modal approach adopted in this study aligns closely with the research objectives, as it offers the flexibility and depth required to address the complexities of paramedicine education and accreditation. While qualitative descriptive research prioritises detailed data collection, a multimodal approach enhances this by incorporating diverse methodologies, allowing for a richer and more comprehensive exploration of the research question. Given the evolving scope of paramedicine practice and the role of accreditation in shaping educational outcomes, a methodology that enables the integration of various methods is essential. The combination of document reviews, content analysis, and the Delphi technique facilitates a broader understanding of how accreditation frameworks influence curricula, uncovering patterns and insights that might otherwise remain hidden.

As Doyle et al. (2020) highlight, multi-modal methodology effectively captures nuances of professional practice, particularly in health-related research, making it an ideal starting point for investigating paramedicine education. Building on this, the multi-modal approach in this study goes beyond simple description by integrating methods that provide detailed insights and broader patterns. It enables the identification of key themes across diverse data sources, ensuring that the research moves beyond surface-level analysis and captures the complexity of paramedic education. This approach also enables a more nuanced examination of the perspectives of educators, accrediting bodies, and practitioners, offering a comprehensive understanding of the field.

The multi-modal methodology also allows for triangulation, enhancing the validity and reliability of the findings by cross-referencing data from different sources. Caelli et al. (2003) noted that understanding individual perspectives within their specific professional context is crucial, particularly in a field as dynamic as paramedicine. This study acknowledges that the evolving nature of paramedicine necessitates a flexible and integrative approach, combining the strengths of various methodologies to produce a comprehensive analysis.

Furthermore, the multi-modal approach reflects the researcher's epistemological and ontological stance, influenced by Critical Theory, which considers how power dynamics and institutional factors shape paramedicine education and accreditation. By incorporating diverse methods, the study ensures that multiple dimensions of the issue are explored, providing a more holistic understanding of the impact of accreditation on paramedic curricula.

Integrating document analysis, thematic analysis, comparative approaches, and literature reviews within this multi-modal framework ensures that the data collected is congruent with the research questions and is systematically analysed to reveal meaningful patterns. This methodology provides depth and rigour to the analysis and supports the study's aim of contributing actionable recommendations for the ongoing development of paramedic education in Australia. The synthesis of these methods results in a comprehensive and robust foundation of evidence that guides the adaptation of paramedic curricula to better prepare students for the evolving demands of the profession.

The qualitative paradigm acknowledges that our understanding of the world (epistemology) is shaped by varying perspectives, including those of both the researcher and participants. This approach is grounded in a philosophical foundation that considers the researcher's position and the underlying assumptions that guide the research process. In this study, the researcher's belief system, centred around Critical Theory, helps to interpret how power dynamics and institutional influences shape paramedicine education and accreditation. This approach enables a more nuanced examination of how these perspectives shape the findings.

A research study is as rigid as the methodology chosen to conduct the research, the theoretical framework used for data collection and analysis, and the relevance of both to answer the research questions (Busetto et al., 2020). Establishing the context and understanding the underlying conceptual factors associated with a chosen study, as well as demonstrating an in-depth understanding of the research methodology, is critical (Creswell & Creswell, 2018). Multi-modal research employs adaptable methods that consider the researcher's values, which can influence the findings. Consequently, the methodology relies on dialogue to uncover insights by exchanging reasoned arguments (Wang & Torrisi-Steele, 2015).

3.6 RESEARCH METHODS

To answer the research question, 'How does the Australian Paramedicine National Registration and Accreditation Scheme prepare paramedic graduates for the evolving scope of practice of paramedicine? ' the scope of practice of paramedics, both nationally and internationally, needs to be explored. Therefore, a deeper dive into paramedicine's evolving scope of practice is necessary to identify factors that significantly influence the changing scope of practice and its impact on the evolution of paramedicine.

Multimodal research enables researchers to explore the multifaceted nature of paramedicine's evolving scope of practice in depth. It provides a platform to explore the various dimensions of this phenomenon, including changes in protocols, advancements in technology, shifts in healthcare policies, and professional perceptions among paramedics. Through its emphasis on in-depth exploration, contextualisation, and stakeholder perspectives, this approach generates valuable insights that can inform practice, policy, and future research endeavours in paramedicine.

The literature review serves as a foundational step for achieving Objective One, which involves understanding the current state of paramedic education in Australia and its alignment with accreditation standards. By synthesising existing research, the literature review identifies knowledge gaps and provides a structured foundation for examining how current accreditation influences the design and delivery of paramedic education. This process also reveals areas of consensus and divergence, which are essential for assessing how well current standards prepare graduates for evolving roles.

By situating the literature review within a Critical Theory framework, this study addresses Objective Three, which emphasises the use of critical theory to analyse the structures and influences within paramedicine education. This framework enables the research to investigate how power structures embedded in accreditation standards influence professional practice and curriculum development. Creswell and Poth (2018) recognise that adapting conceptual frameworks as new insights emerge is critical to the depth of qualitative analysis, thereby enhancing the study’s potential to generate nuanced perspectives on educational structures and their alignment with professional needs.

Critical theory serves as the overarching conceptual framework in this qualitative research, guiding the analysis of power dynamics, social structures, and ideological influences within paramedicine education. This framework is crucial for assessing how accreditation standards and educational structures influence graduates' readiness to meet the profession's evolving demands. The RESPIGHT framework, which structures the qualitative analysis, provides a lens for systematically examining these influences within the data collected.

Research objectives two and four call for a critical evaluation of the RESPIGHT framework to assess its effectiveness in addressing current curriculum needs and to identify areas for refinement. Through this iterative process, new insights may emerge that suggest potential enhancements or modifications to the framework, aligning it more closely with the evolving scope of paramedicine practice in Australia. This dynamic approach reflects the flexibility inherent in qualitative research, allowing frameworks and methodologies to evolve in response to ongoing analysis and reflection.

International Context and Curriculum Analysis

Since paramedicine is a relatively new profession in higher education (Veronese, 2018), understanding its positioning within Australia requires an international perspective on paramedic education. A comprehensive literature review was conducted to assess and compare curricula across Australian universities, identifying specific units designed to prepare students for the profession’s current and anticipated scope of practice. This review, outlined in the first journal article of the thesis, highlights the variability in curriculum design and the need for greater alignment between regulatory frameworks, educational standards, and the evolving scope of paramedic practice.

3.6.1 Method One - Comparative Education Method

Comparative education is a valuable tool in evaluating educational programs by identifying and incorporating strengths from one system into another. This research method has been widely used in nursing education to identify dynamic educational systems and disparities between Australian and international education models (Siles Gonzalez et al., 2016). Therefore, the comparative education research methodology in paramedicine education, as well as its potential for identifying best practices and

informing educational policy, is comparable to that in nursing education. Comparative education research methodology is a rigorous approach that compares systems and structures, curricula and pedagogies, and analyses the nature of the field itself (Adamson & Morris, 2014). The method involves thoroughly reviewing the literature and trends in the field, probing research purposes and methodologies, and comparing systems to identify best practices.

This method has been widely used in nursing education to identify the strengths and weaknesses of educational programs in different countries and to inform educational policy.

Comparative education has been utilised in nursing education to identify disparities in educational systems and develop best practices. For example, Siles Gonzalez, Solano Ruiz, and Gaban Gutierrez (2016) used comparative education to compare nursing education models in Australia and internationally. The study identified differences in the curricula and pedagogies used in the two countries, highlighting the need for a more dynamic approach to nursing education (Siles Gonzalez et al., 2016). Similarly, Keeves (2015) employed comparative education to identify strengths in the international nursing education system that could be incorporated into the Australian system (Keeves, 2015).

As paramedicine continues to evolve as a university-level qualification, its establishment as a recognised scientific discipline remains a work in progress. A significant issue in this development is whether a theoretical model exists that effectively grounds teaching and learning in paramedicine and supports curriculum development within higher education institutions. This method addresses this gap by exploring and comparing the availability and applicability of conceptual and theoretical frameworks in paramedic education.

The review focused on publications authored by paramedic academics, as their dual roles as higher education professionals and experienced practitioners provide them with unique insights into pedagogical approaches in paramedic education. The inclusion criteria for this review were:

- Publications in English
- Direct relevance to paramedic education or curriculum development
- Focus on learning, teaching, and/or assessment in paramedic education

A systematic review was conducted in accordance with the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) protocol, as outlined by Moher et al. (2009). The search targeted peer-reviewed journal articles published between 1994 and 2019, with 1994 marking the introduction of paramedic education into the higher education sector in Australia. This starting point was chosen as it likely coincides with the beginning of research and literature around paramedic higher education in Australia and New Zealand.

The databases searched included:

- EMBASE
- EBSCO
- Medline
- CINAHL
- ScienceDirect
- PubMed

The search terms used were:

- "paramedic education"
- "paramedic higher education"
- "paramedic curriculum"
- "paramedic theoretical frameworks"

In addition to peer-reviewed articles, grey literature, including university handbooks, accreditation documents, and curriculum renewal materials, was reviewed. This step aimed to identify any existing frameworks that support curriculum development in paramedicine and evaluate their validity in informing current and future paramedic practices.

3.6.2 Method Two - Descriptive-Comparative Method

Using a descriptive-comparative review in paramedicine is valuable in identifying the relevance of accreditation and curriculum guidance documents adopted by one jurisdiction to Australia's current and future practices. Asgari et al. (2019) argue that higher education institutions should review different curricula to provide

comprehensive curricula. This thesis presents a descriptive-comparative study examining the Australian paramedicine curriculum in comparison to the United Kingdom curriculum. Lau & Holbrook (2017) note that descriptive-comparative studies enhance understanding of one variable in relation to another, which is particularly relevant to the present study.

Descriptive-comparative curricula studies help identify the strengths of one curriculum to support the weaker curriculum (Spillane et al., 2022). In contrast to undertaking content analysis, a descriptive-comparative study offers flexibility in terms of theoretical direction and data sources (Hsieh & Shannon, 2005). A descriptive-comparative method is a research approach frequently utilised in situations where overlapping patterns may exist, but these patterns are defined differently. This methodology systematically analyses data from multiple sources to identify similarities and differences between the observed phenomena. Therefore, descriptive-comparative studies aim to identify patterns of similarities and differences (Hsieh & Shannon, 2005).

The steps undertaken to determine the results of the descriptive-comparative study are underpinned by Brady's four-step model. Brady's model is a later adaptation of the origins of the four-step comparison model, developed in the 1950s and 1960s by Bereday and Hilker (Adick, 2018). Brady's model employs five steps to determine the results: description, interpretation, juxtaposition, comparison, and evaluation (Asgari et al., 2019).

The study employed a descriptive-comparative approach to analyse the regulatory frameworks within paramedicine education across different Anglosphere regions.

Comparison of regulatory frameworks.

An in-depth examination of international paramedic regulatory frameworks and educational systems is essential for understanding the variations in these structures, the factors driving these differences, and their subsequent effects on curricula. This analysis is informed by the work of Willis et al. (2009), which emphasised the necessity of evaluating dynamic educational systems and identifying disparities in education models within nursing. This framework is similarly applicable to paramedicine.

To gain a comprehensive understanding of paramedic education, we employed a descriptive-comparative approach, integrating a modified version of Brady's model. The study focuses on five core countries within the Anglosphere: Australia, New Zealand, the United Kingdom, Canada, the United States, and South Africa. These countries were selected due to their developed status, cultural, diplomatic, educational, and military connections, as well as similar paramedic care models.

We utilised Brady's model, specifically its first three stages — description, interpretation, and juxtaposition, in our analysis. This model provides a structured approach to evaluating paramedic curricula, ensuring a detailed examination of educational programs.

Description

In this initial stage, we collected data on paramedic curricula from the selected countries by reviewing grey literature, including university handbooks, accreditation documents, and curriculum renewal reports. Additional sources included documents from government bodies, professional organisations, and statutory bodies to identify comparable international curriculum elements.

Interpretation

We organised and analysed the collected data using tables and figures during the interpretation stage. This process involved synthesising information from the six countries to identify commonalities and differences in their paramedic curricula.

Juxtaposition

The third stage involved a detailed comparative analysis of the countries' regulatory frameworks and educational systems. This stage enabled an in-depth examination of how the country structures and regulates paramedic education, with findings discussed in detail within this paper.

3.6.3 Method Three - Comparative Education Approach

The comparative education model, which involves analysing and contrasting educational systems across various countries, has proven effective in evaluating and improving educational programs. This approach enables the identification of strengths in one system that can be adapted to enhance others. It has been successfully applied

in comparative research within nursing education and is valuable for advancing paramedic education.

The modified Brady's model, combined with a comparative education approach, provides a robust framework for analysing and understanding international paramedic education systems. This study highlights the utility of such frameworks in identifying best practices and guiding future research in paramedic education. While the study evaluated and compared regulatory frameworks within paramedicine education across different Anglosphere regions, it still needs to fully answer the research objective for assessing that framework by comparing it with other jurisdictions outside Australia.

The descriptive-comparative study has limitations, with the results being unreliable due to the potential for non-representative categories or inaccurate information on categories (Aggarwal & Ranganathan, 2019). In the context of this study, a descriptive-comparative method was employed to identify the key concepts from an accreditation framework that inform the curriculum and evolve in response to changes in the scope of practice. In such instances, alternative research methods may be necessary.

These methods include further literature analysis and a further descriptive-comparative review. While the descriptive-comparative approach helps compare and contrast different phenomena, it may not be appropriate for situations where the data is complex and multidimensional. In the case of the accreditation framework, the data may constantly evolve and be influenced by multiple factors, such as changes in legislation, advancements in technology, and shifts in professional standards and best practices. Therefore, for this study, the second method incorporated into the descriptive-comparative approach is a narrative literature review, which serves as an additional source of data.

3.6.4 Method Four - Narrative Review

To fully address the research objective of evaluating the framework by comparing it with other jurisdictions outside Australia, a further literature review was required to identify studies on curriculum development that could be applied in paramedic education, with a contribution from a framework within the National Registration and Accreditation Scheme (NRAS). For this case study, the literature review method adopted a narrative synthesis of the literature.

A literature review is valuable for identifying studies that can be used in paramedic education, with a framework provided by the National Registration and Accreditation Scheme (NRAS). This review method focuses on qualitative data by identifying and discussing significant themes in literature (Popay et al., 2006). A narrative synthesis review is a textual approach that arranges the identified studies into regular, standardised groupings (Barnett-Page & Thomas, 2009).

Qualitative data analysis is essential in understanding the contribution of the National Registration and Accreditation Scheme (NRAS) to paramedic education. It is increasingly considered an effective alternative to existing evaluation methods (Pattyn et al., 2019). Qualitative research offers a clear perspective on a framework and draws conclusions based on specific thematic evidence (Thomas & Harden, 2008).

A narrative review was conducted to identify and analyse specific competency frameworks related to paramedicine and paramedic education. This review built upon earlier scoping studies that outlined various competency frameworks for paramedicine and paramedic education. It focused on the development of standards of practice, competency maps, competency frameworks, competency-based conceptual models, and competency assessment tools. In this context, it is important to distinguish between "competence," which refers to the description of work tasks, and "competency," which encompasses the description of attributes.

The review utilised Arksey & O'Malley's (2005) methodological framework, applying a narrative review methodology to explore purpose-relevant and theoretically derived research. This approach was designed to provide a broad yet intentional focus on research that could inform a competency framework for paramedicine. The search for relevant literature was conducted using the following databases: EMBASE, EBSCO, Medline, CINAHL, ScienceDirect, and PubMed. Boolean operators (AND, OR) were used to refine the search, incorporating keywords such as "paramedic education," "paramedic higher education," "paramedic competence," "paramedic competency frameworks," and "paramedic competency." The initial search commenced on November 16, 2022, and was finalised on December 4, 2023. The review considered peer-reviewed journal articles published from 1994 to 2023. The year 1994 was chosen because it marked the introduction of paramedic education in higher education institutions in Australia, signalling the beginning of relevant research and literature in the field.

In addition to peer-reviewed articles, grey literature was reviewed, with a focus on reports from paramedicine accreditation bodies and professional organisations. The review process consisted of five stages. The first stage involved searching for peer-reviewed journal articles across several databases. Following this, the standards of paramedicine accreditation bodies and professional bodies' reports were manually searched. Articles not related to the search terms were excluded, and inclusion was based on the relevance of the abstract or, if necessary, a review of the introduction.

In the third stage, themes relevant to a competency framework were identified. These themes were categorised into significant headings and coded using Microsoft Excel. The fourth stage involved mapping these themes to the five domains of the Professional Capabilities of registered paramedics. Text network analysis was employed to analyse and correlate significant groupings with the domains, facilitating a content analysis of the domains and matching terminology.

The final stage utilised bubble charts to visually represent the relationships between the literature findings and the Professional Capabilities. The charts depicted three data dimensions: (1) the themes derived from the literature review, (2) their alignment with the Professional Capabilities, and (3) the size of the bubbles reflecting the strength of the relationship between the findings and the competencies.

The results of the narrative review and thematic analysis are discussed in relation to the Professional Capabilities. The bubble charts provided a visual representation of how literature findings aligned with competency domains, highlighting key areas of overlap and identifying gaps.

This narrative review provides a comprehensive analysis of competency frameworks and assessment tools within the field of paramedicine. By integrating findings from peer-reviewed and grey literature, the study contributes valuable insights into the development and application of competency frameworks in paramedic education. The use of thematic analysis and visual data representation, such as bubble charts, provides a structured approach to understanding the alignment of competencies with professional standards.

Evolving scope of practice of paramedicine

This section outlines a two-step process employed to analyse current and emerging models of care in paramedicine and assess the alignment of Australian

undergraduate pre-registration paramedicine curricula with these models. The RESPIGHT model of care, developed by O'Meara and colleagues (2016), was used as a framework to guide this analysis. RESPIGHT stands for Response to emergencies, Engaging with communities, Situated practice, Primary healthcare, Integration with health, aged care, and social services, Governance and leadership, Higher education, and Treatment and transport options.

A review of the literature was conducted to explore current and emerging models of care in paramedicine, with a focus on recent developments. The search targeted peer-reviewed literature published between 2018 and October 2022 and was conducted across multiple databases, including Google Scholar, PubMed, ProQuest, and EBSCOHost. The search terms used included:

- "community paramedicine"
- "rural health"
- "community engagement"
- "model of care"
- "future healthcare"
- "integration"
- "leadership" AND paramedicine AND Australia

In addition to peer-reviewed sources, grey literature such as government reports and documents from professional organisations was reviewed to provide additional context on models of care and policy developments relevant to paramedicine.

The RESPIGHT model of care was utilised as the framework for analysing the literature on paramedicine models of care. Although this framework has not been widely applied in paramedicine macro-analysis, it provided a helpful structure for categorising current and emerging trends. By organising the findings into the seven RESPIGHT domains, conceptual connections were identified that further refined the understanding of how paramedic roles are evolving, particularly in community engagement and integration with broader healthcare systems.

The literature search and selection followed a modified PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) approach. The process

involved identifying relevant articles, applying inclusion and exclusion criteria, and categorising the findings according to the RESPIGHT domains. The findings revealed key trends and future directions for paramedicine, including increased emphasis on community paramedicine, leadership in integrated healthcare settings, and enhanced collaboration with primary care and social services.

To assess how well the Australian undergraduate paramedicine curricula align with the identified models of care, a search was conducted on the Australian Health Practitioner Regulation Agency (Ahpra) website. The search targeted all accredited undergraduate pre-registration paramedicine programs leading to professional registration. This search identified 22 entry-level paramedicine programs across 16 universities in Australia, offering qualifications under various nomenclatures and varying durations. Nine programs included the terms "Paramedic," "Paramedicine," or "Practice," while seven used terms such as "Paramedic Science" or "Health Science." Two programs were dual degrees in paramedicine and nursing, while four qualifications were offered at the Honours or postgraduate level under the Australian Qualifications Framework (AQF).

For each of the single-degree paramedicine programs, curriculum documents, including subject titles, subject profiles, and learning outcomes, were retrieved. These documents were analysed to determine the extent of alignment between the educational content and the RESPIGHT model's domains, as identified in the literature review.

The data were categorised according to the RESPIGHT domains, and thematic connections were drawn to assess whether the curricula addressed key areas such as community engagement, governance and leadership, primary healthcare integration, and treatment and transport options. This process involved a content analysis of learning outcomes, matching them against the trends and categories developed in step one.

This two-step analysis provided valuable insights into how paramedic education in Australia aligns with current and future models of care. The RESPIGHT model proved effective as a framework for both analysing the literature on paramedicine's evolving roles and assessing the alignment of undergraduate curricula with these developments.

To fully understand and respond to the research question in this thesis, further research was required to determine whether the perceptions of paramedic academics align with the existing literature on accreditation frameworks, which supports the evolving scope of practice in paramedicine. Therefore, further research into the Australian curriculum through an expert consensus evaluation of subjects was also required. Furthermore, the descriptive-comparative study data source mentioned previously could support the Consensus Method through a modified Brady's Model and extend the comparative education model.

3.6.5 Method Five - Consensus Method

Consensus reviews can complement objectives two and four by facilitating collaboration and agreement among experts in the field. By engaging stakeholders from diverse jurisdictions and professional backgrounds, a consensus review can help identify common ground, develop consensus statements, or formulate recommendations for enhancing paramedic practice, accreditation standards, and curriculum development on a global scale.

This thesis proposes a consensus method for identifying specific educational themes or subjects necessary to prepare paramedic students for the transition to current and evolving practice. It examines whether the accreditation documents support the consensus findings. Experts in curriculum development were actively involved in this process. Additionally, the thesis explores the Australian paramedicine context, identifying relevant subjects and frameworks through expert consensus. To achieve these objectives, the Delphi technique (Dalkey & Helmer, 1963) was employed to gather expert opinions, utilising this qualitative method to elicit feedback from a panel of experts and provide consensus opinions on the topics at hand.

Academics were explicitly tasked with evaluating key themes and subjects within current paramedicine curricula to assess their relevance in preparing paramedics for an expanding scope of practice. To achieve this, they were asked to collaboratively reach a consensus on which topics were most essential for equipping paramedic graduates to navigate the evolving demands of the profession. This process was vital for ensuring that educational programs effectively address both the current and future needs of the workforce. Furthermore, the subjects under review were systematically aligned with the RESPIGHT criteria, which provided a structured framework for identifying the essential competencies needed for practice. This framework served as

a guide for evaluating the curriculum's adequacy in preparing students for the complexities of modern paramedicine practice.

A literature scan was conducted to identify potential methods for consensus research, which yielded three possible options: Delphi, Nominal Group, and Emerging Issue Analysis (EIA). While the Nominal Group method (NGM) is a mixed-method approach that can provide qualitative and quantitative information in health education research, it has been underutilised in previous research (Harb et al., 2021). The NGM involves face-to-face small-group discussions, allowing participants to share their perspectives equally. However, this approach lacks anonymity, which may lead to a debate about the strength of paramedic pedagogy and the variance of extreme opinions among different experts in paramedic education.

The EIA approach is crucial for identifying future practices by examining what was previously deemed unnecessary (Nie et al., 2009). While paramedicine must consider emerging trends for future practice, this method is not suitable for this case study, as understanding past practices is just as important. In paramedicine, current and historical evidence-based clinical guidelines inform the recommendations provided to education providers. For this reason, the Delphi technique was chosen for this study. It enables the collection of expert opinions while maintaining anonymity, a crucial aspect for obtaining reliable and relevant findings.

A review of the literature on research methodologies has identified the Delphi technique (Dalkey & Helmer, 1963) as a valuable tool for scoping future research, particularly compared to other qualitative methods. Developed by the Rand Corporation in the 1950s, the Delphi technique is a flexible approach widely used in various fields, including health education and medical research (Brady, 2015). The Delphi technique is a structured method used to gain consensus and reach decisions among experts on a specific topic (Dalkey & Helmer, 1963). The Delphi technique is a flexible approach that can be applied to various research fields and is particularly useful when there is a need for more empirical data or when expert opinions are required (Dalkey & Helmer, 1963). The technique aligns with a critical research paradigm and constructivist ontology, rendering it a valuable tool for scoping future research.

The Delphi technique has been considered a desirable method for research higher degrees for many years (Murry & Hammons, 1995). This aligns with a critical research

paradigm and a constructivist ontology. Researchers have found the Delphi technique to be effective in curriculum development (Moynihan et al., 2015), assessing student performance (Löfmark & Mårtensson, 2017), and identifying core competencies in health education (Moynihan et al., 2015).

The Delphi technique is a valuable instrument for identifying common interests among homogenous groups (de Meyrick, 2003), as highlighted in a recent study on the definition of paramedicine (Williams, 2021). However, claiming that one group represents valid expert opinion has been criticised as scientifically untenable and overstated (Brady, 2015). Despite this criticism, the Delphi technique remains a valuable tool for scoping future research. Compared to other qualitative methods, it has been recognised as the research method for information scoping.

The decision to employ the Delphi method in this research is based on its suitability for achieving expert consensus on complex and evolving topics within paramedicine education. Given that this study aims to evaluate and propose improvements to paramedicine curricula, aligning with accreditation standards and the evolving scope of paramedic practice, the Delphi approach is particularly advantageous.

The Delphi method is a structured process that engages a panel of experts in iterative rounds of questionnaires, enabling the group to progressively reach a consensus on key issues (Dalkey & Helmer, 1963). It is commonly used in areas with uncertainty or lack of agreement on a particular subject, making it ideal for exploring the future directions of paramedicine education—a field characterised by its rapid evolution in recent years.

While Grounded Theory is often used to develop new theoretical frameworks, it was deemed less appropriate for this research. The primary aim of this study is to evaluate and refine existing frameworks, namely the accreditation standards and educational curricula in paramedicine, rather than to generate new theories. The focus here is on practical, evidence-based recommendations for curriculum improvement rather than the creation of new theoretical models. As Sandelowski (2000) points out, methods such as Grounded Theory are more suited for studies that aim to develop theory from emergent data. In contrast, the goal of this study is descriptive and evaluative, making the Delphi method a more fitting choice. The Delphi method supports the generation of practical solutions based on expert consensus, aligning with

the overall research aim of enhancing educational frameworks in line with accreditation standards.

Evolving Needs of Paramedicine Education.

This study employs a consensus methodology, incorporating a Delphi process within a sequential meta-synthesis framework, to address the evolving needs of paramedicine education in Australian higher education. The research aims to identify essential curriculum components necessary to prepare paramedic graduates for roles in primary healthcare, aligning with established professional practice domains.

Key steps in the methodology include:

Consensus Evaluation: A Delphi process engaged 68 paramedic academics to establish agreement on critical curriculum categories essential for graduate preparedness.

Data Integration: Professional capabilities for paramedicine were synthesised, and data from curricula across sixteen institutions were extracted and analysed.

Framework Alignment: The RESPIGHT model of care was employed as an analytical framework to map curriculum alignment with primary healthcare demands.

3.7 POPULATION AND SAMPLE SELECTION

In this multi-modal study, the concept of "population" extends beyond the traditional empirical scope to encompass a comprehensive range of literature, documentation, and educational frameworks related to paramedicine education and accreditation. This broadened approach includes a spectrum of sources essential to understanding the training and professional standards within paramedicine. Literature on paramedicine competencies provides the foundation, offering insights into the core skills and capabilities expected of paramedics, as reflected in scholarly articles, research reports, and theoretical frameworks. Complementing this is an examination of accreditation frameworks and standards, including documentation on processes, benchmarks, and guidelines that structure paramedic education in Australia and internationally.

The study also considers the educational models and curricula employed by Australian institutions offering paramedicine programs. This is supported by a comparative analysis incorporating international educational models to assess diverse

curriculum design and evaluation approaches. Perspectives from Australian universities and paramedic academics add another layer, reflecting institutional practices and insights into curriculum development tailored to the profession's needs.

In this context, "sample size" is defined by the breadth of documents and thematic elements analysed rather than by a numerical count of individual participants, consistent with the qualitative nature of this study. Document analysis produced 278 themes, organised into 22 primary analytical categories, capturing key elements and theoretical underpinnings from the literature. This was augmented by an analysis of paramedicine curricula from 16 Australian universities, assessing their alignment with the RESPIGHT model of care and their relevance to Australian rural paramedic practices. To enhance the reliability and consensus validity of the findings related to curriculum components, a Delphi process was conducted with 68 paramedic academics. The iterative nature of the Delphi method, incorporating rounds of feedback and refinement, supports methodological credibility through expert consensus, providing a broader and more balanced representation than a single perspective could offer.

These elements define the research population as encompassing literature on paramedicine competencies, accreditation standards, educational frameworks, university curricula, and academic perspectives on curriculum development. This multifaceted approach supports a thorough qualitative analysis of documentation and expert perspectives, offering a comprehensive and nuanced understanding of paramedicine education and accreditation. This approach extends beyond quantifiable participant data, offering a rich and integrated exploration of both the structural and conceptual dimensions that shape paramedic training and professional preparedness.

3.8 DATA ANALYSIS

Data for this qualitative study were collected using a combination of the Delphi technique, document analysis, and thematic analysis. The first round of the Delphi process involved distributing open-ended questionnaires to a panel of paramedicine educators, graduates, and representatives from the accrediting body. These qualitative questionnaires provided detailed descriptions of participants' experiences and offered valuable insights into how accreditation standards influence the development of the curriculum.

Data were collected through a combination of literature reviews, content analysis, and the Delphi technique:

Literature Review and Content Analysis: A systematic review of the Australian and New Zealand paramedic curricula was conducted. Curriculum handbooks were analysed using an Excel spreadsheet to catalogue and categorise subjects taught. This analysis involved a manual search for content and an inductive thematic analysis to identify recurring themes and categories relevant to the study's focus. This approach facilitated the extraction of themes aligned with the specified subject headings.

Delphi Technique: The Delphi technique was used to gather expert opinions from paramedic academics. This method involved three rounds:

Round One: Academics were asked to provide a list of essential subjects, units, or topics for paramedic students without predefined categories. Responses were analysed qualitatively to identify and categorise key curriculum components.

Round Two: The identified components were rated on a Likert scale to assess their importance in preparing students for competent and independent practice. This round aimed to achieve a consensus on the most critical aspects of the curriculum.

Round Three: Experts reviewed the compiled list of components and their scores from Round Two. They had the opportunity to revise their scores or add new components, contributing to the final consensus on curriculum priorities.

Analysis Techniques:

Content Analysis: In Round One, content analysis was performed on open-ended survey responses. All statements were entered into a word processing document and categorised under relevant themes. The analysis aimed to ensure thematic rigour and validate the themes against the United Kingdom's College of Paramedics' fields of study.

A summary of the Likert scale is in Table 3.1, with a more straightforward explanation provided to the academics as follows:

1: no importance at all; very unlikely it will contribute to providing graduates with the skills, theory, and knowledge to be job-capable and prepared for rapid changes in practice.

2: not very important, unlikely it will contribute to providing graduates with the skills, theory, and knowledge to be job-capable and prepared for rapid changes in practice.

3: possibly or sometimes important, it may contribute to providing graduates with the skills, theory, and knowledge to be job-capable and prepared for rapid changes in practice.

4: important, in most instances, it will contribute to providing graduates with the skills, theory, and knowledge to be job-capable and prepared for rapid changes in practice.

5: extremely important, very likely it will contribute to providing graduates with the skills, theory, and knowledge to be job-capable and prepared for rapid changes in practice.

Table 3.1 Likert Scale with the Delphi Study.

1	Unit of study not important, very unlikely to enhance clinical judgement ability of students to make them road-ready,
2	Unit of study not very important, unlikely to enhance clinical judgement ability of students to make them road-ready,
3	Unit of study possibly important may be likely to enhance clinical judgement ability of students to make them road-ready,
4	Unit of study important, most likely to enhance clinical judgement ability of students to make them road-ready,
5	Unit of study extremely important, very likely to enhance clinical judgement ability of students to make them road-ready,

Quantitative Analysis: For Round Two, statistical analysis was conducted using SPSS (Statistical Package for the Social Sciences) Version 23. Responses were entered as separate variables, and frequencies were calculated to determine the percentage of responses at various Likert scale levels. Means and standard deviations were computed to assess the overall importance of each curriculum component.

	Name	Type	Width	Decimals	Label	Values	Missing	Columns	Align	Measure	Role
1	Introbioscie...	Numeric	8	2	Physical Scien...	{1.00, no im...	None	8	Right	Scale	Input
2	Biochemistry	Numeric	8	2	Physical Scien...	{1.00, no im...	None	8	Right	Scale	Input
3	Chemistry	Numeric	8	2	Physical Scien...	{1.00, no im...	None	8	Right	Scale	Input
4	Foundationb...	Numeric	8	2	Physical Scien...	{1.00, no im...	None	8	Right	Scale	Input
5	Pharmacology	Numeric	8	2	Physical Scien...	{1.00, no im...	None	8	Right	Scale	Input
6	Anatomy	Numeric	8	2	Life Science - ...	{1.00, no im...	None	8	Right	Scale	Input
7	Pathophysi...	Numeric	8	2	Life Science - ...	{1.00, no im...	None	8	Right	Scale	Input
8	MedPhysiol...	Numeric	8	2	Life Science - ...	{1.00, no im...	None	8	Right	Scale	Input
9	PathoinPrim...	Numeric	8	2	Life Science - ...	{1.00, no im...	None	8	Right	Scale	Input
10	Microbiology	Numeric	8	2	Life Science - ...	{1.00, no im...	None	8	Right	Scale	Input
11	Maternalchil...	Numeric	8	2	Social, health a...	{1.00, no im...	None	8	Right	Scale	Input
12	Pathwaysof...	Numeric	8	2	Social, health a...	{1.00, no im...	None	8	Right	Scale	Input
13	Marganilise...	Numeric	8	2	Social, health a...	{1.00, no im...	None	8	Right	Scale	Input
14	Drugsofabuse	Numeric	8	2	Social, health a...	{1.00, no im...	None	8	Right	Scale	Input
15	Chronicdise...	Numeric	8	2	Social, health a...	{1.00, no im...	None	8	Right	Scale	Input
16	Mentalhealth	Numeric	8	2	Social, health a...	{1.00, no im...	None	8	Right	Scale	Input
17	Epidemeology	Numeric	8	2	Social, health a...	{1.00, no im...	None	8	Right	Scale	Input
18	Publichlth	Numeric	8	2	Social, health a...	{1.00, no im...	None	8	Right	Scale	Input
19	Specialpop	Numeric	8	2	Social, health a...	{1.00, no im...	None	8	Right	Scale	Input
20	Hlthmodels	Numeric	8	2	Social, health a...	{1.00, no im...	None	8	Right	Scale	Input
21	Alternatecare	Numeric	8	2	Social, health a...	{1.00, no im...	None	8	Right	Scale	Input
22	MIAMI	Numeric	8	2	Social, health a...	{1.00, no im...	None	8	Right	Scale	Input
23	Remotecare	Numeric	8	2	Social, health a...	{1.00, no im...	None	8	Right	Scale	Input
24	Labvalues	Numeric	8	2	Clinical Scienc...	{1.00, no im...	None	8	Right	Scale	Input
25	Clinicalasse...	Numeric	8	2	Clinical Scienc...	{1.00, no im...	None	8	Right	Scale	Input
26	ECG	Numeric	8	2	Clinical Scienc...	{1.00, no im...	None	8	Right	Scale	Input
27	AdvECG	Numeric	8	2	Clinical Scienc...	{1.00, no im...	None	8	Right	Scale	Input
28	Lawethics	Numeric	8	2	Ethics and Law...	{1.00, no im...	None	8	Right	Scale	Input
29	Decisionma...	Numeric	8	2	Ethics and Law...	{1.00, no im...	None	8	Right	Scale	Input
30	Cultural	Numeric	8	2	Ethics and Law...	{1.00, no im...	None	8	Right	Scale	Input
31	Legalpremise	Numeric	8	2	Ethics and Law...	{1.00, no im...	None	8	Right	Scale	Input
32	Ethical	Numeric	8	2	Ethics and Law...	{1.00, no im...	None	8	Right	Scale	Input
33	Resolvingdil...	Numeric	8	2	Ethics and Law...	{1.00, no im...	None	8	Right	Scale	Input
34	Ptassessm...	Numeric	8	2	Patient assess...	{1.00, no im...	None	8	Right	Scale	Input
35	Medemerge...	Numeric	8	2	Patient assess...	{1.00, no im...	None	8	Right	Scale	Input
36	Trauma	Numeric	8	2	Patient assess...	{1.00, no im...	None	8	Right	Scale	Input
37	Consolidated	Numeric	8	2	Patient assess...	{1.00, no im...	None	8	Right	Scale	Input
38	MedDx	Numeric	8	2	Patient assess...	{1.00, no im...	None	8	Right	Scale	Input
39	Paeds	Numeric	8	2	Patient assess...	{1.00, no im...	None	8	Right	Scale	Input

Figure 3.1 View of variables of responses from responses of academics

Reliability Analysis: Cronbach's alpha coefficient was used to measure the reliability of the Delphi technique responses. With 64 participants and a coefficient alpha of 0.996, the analysis indicated high reliability and internal consistency of the responses, exceeding the acceptable threshold of 0.70.

Trustworthiness within the study

The trustworthiness of research findings is essential in ensuring the credibility, applicability, and reliability of qualitative studies. The criteria of credibility, transferability, dependability, and confirmability (Ahmed, 2024) provide a structured approach to validating research conclusions. Credibility is reinforced through member checking and triangulation, ensuring the study's findings accurately represent participants' experiences. Transferability is achieved by providing rich contextual descriptions, allowing the results to be applied to similar educational and accreditation settings. Dependability ensures that the research process is systematic and reproducible, aligning with the structured evaluation of curriculum gaps and competency alignment in paramedic education. Finally, confirmability strengthens

objectivity by ensuring findings are derived from data rather than researcher bias, which is particularly important in assessing accreditation inconsistencies and competency development. The study's key findings on curriculum misalignment, accreditation gaps, and the evolving scope of practice for paramedics are reinforced by applying these trustworthiness criteria, thereby enhancing their reliability and applicability to future paramedic education reforms (Ahmed, 2024).

Limitations and Ethical Considerations:

This study is predominantly focused on paramedic practice within Jurisdictional Ambulance Services (JAS), which are reported to employ the majority of paramedics across Australasia. While the private and non-JAS sectors are expanding, they were not a primary focus of this research. This reflects both the current employment patterns of paramedicine graduates who typically seek roles in JAS due to industry preference for JAS experience and the availability of data. As such, findings may not fully capture the scope of paramedic practice in non-JAS contexts, and this should be considered when interpreting the generalisability of the results.

While the perspectives of industry stakeholders provided valuable insights into curriculum relevance and graduate preparedness, a key limitation of this study is the absence of direct input from consumers of paramedic services—including patients, families, and the broader community.

The study's reliance on qualitative data and expert opinions means that findings may be influenced by the subjective nature of the responses and the specific expertise of the participating academics. Additionally, while the Delphi technique aims for consensus, achieving a 90% agreement (mean score of 4.5/5) was considered indicative of expert consensus.

Ethical approval was obtained for the study, ensuring that participants' contributions were handled confidentially and that their participation was voluntary. All responses were anonymised, and participants were provided with feedback on the study's progress and outcomes.

Triangulation of data in multi-modal research

Multi-modal research utilises multiple data sources collected and triangulated through the research methods described above, as well as a combination of these methods. Triangulation is methodological process whereby qualitative research

achieves data saturation from two perspectives (Wray et al., 2016). This triangulation of qualitative data, achieved by merging information from different sources, increases the study's rigour. These different perspectives can provide a comprehensive understanding of the studied phenomena (Carter et al., 2014). Data triangulation can reduce unintentional generalisation impacts by presenting a more thorough review of the topic under investigation. Other forms of triangulation identified in the literature include (a) method triangulation, (b) investigator triangulation, (c) theory triangulation, and (d) data source triangulation (Carter et al., 2014). Figure 3.2 is a schematic representation of the thesis's concept, incorporating multi-modal research and all the methods discussed.

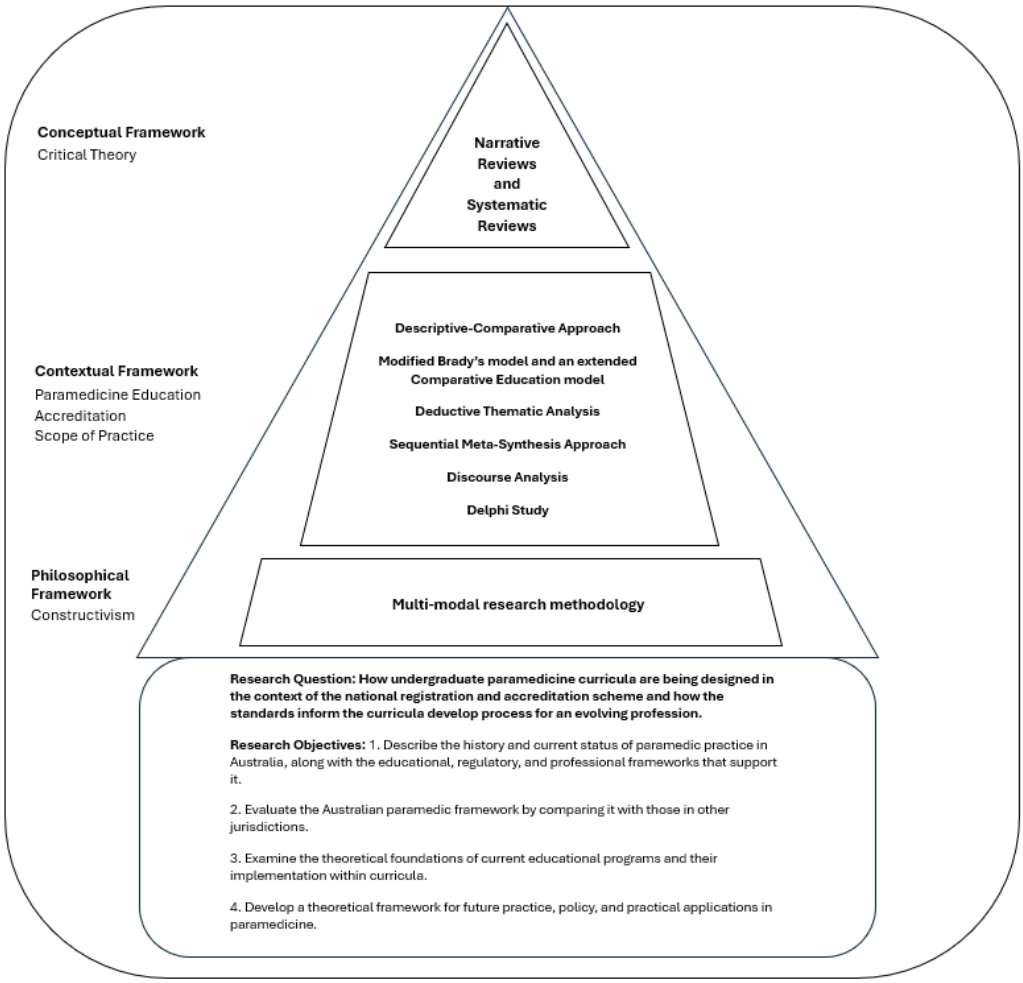

Figure 3.2 Multi-modal research methodology

Although the comparative education research method was the first method discussed and would generally be one of the first methods used, it can also become the final stage of the descriptive-comparative study. This thesis's descriptive–comparative approach incorporates a comparative education perspective. In previous research, the

comparative education model has been employed to compare nursing curricula (Asgari et al., 2019).

The comparative education model involves analysing and comparing educational systems across several countries, utilising nursing education as a comparative research approach (Siles Gonzalez et al., 2016). Consequently, Brady's model fits perfectly with this thesis. Figure 3.2 illustrates the data collection process for each method, outlining the steps taken to formulate the study's findings.

In this multi-modal research, triangulation was essential for ensuring the validity and comprehensiveness of the findings. Triangulation involves using multiple data sources and methods to achieve a more robust and nuanced understanding of the research phenomena (Wray et al., 2016). This study enhanced its rigour by integrating different perspectives and data sources and comprehensively analysed paramedicine education and accreditation.

The study utilised several sources and methods, including:

Literature Review: A broad review of existing literature on paramedicine competencies, accreditation frameworks, and educational models provided foundational insights. This included analysing documents from various countries to understand different approaches to paramedic education.

Curriculum Content Analysis: A systematic analysis of curricula from 18 Australian universities enabled detailed comparisons of educational content and alignment with the RESPIGHT model of care. This content analysis was conducted using automated and manual methods to ensure thorough examination.

Delphi Technique: The Delphi method involved multiple rounds of expert consultation. This iterative process ensured that the final consensus reflected a well-rounded view of critical curriculum elements.

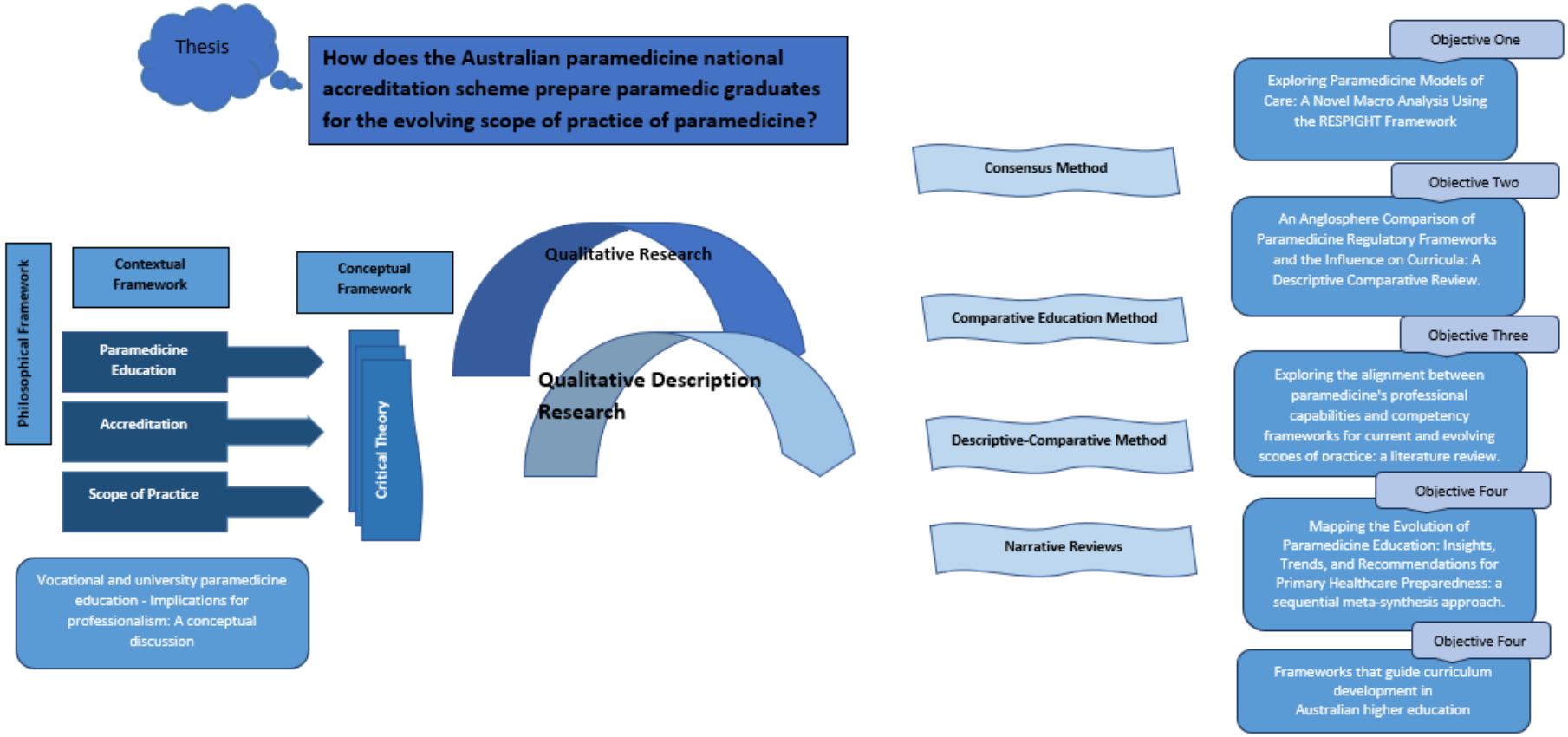

Figure 3.3 Representation of the data collection process

Triangulation is a critical strategy in qualitative research. By integrating multiple perspectives and methods, the study enhances the validity and reliability of its findings. This study employed several forms of triangulation to comprehensively analyse paramedicine education and accreditation.

Data source triangulation involved combining various sources, including literature reviews, content analysis, and expert consensus, using the Delphi technique. This approach addressed the limitations associated with relying on a single data source by incorporating various perspectives and types of data. By synthesising findings from these different sources, the study offered a more nuanced and enriched understanding of paramedicine education, capturing a broader view of the subject matter.

Methodological triangulation was achieved by employing both qualitative and quantitative research methods. Qualitative methods included thematic analysis of curricula, which provided in-depth insights into the content and structure of paramedicine programs. Quantitative methods involved statistical analysis of Delphi survey responses, which empirically validated the curriculum components identified through qualitative analysis. This combination of methods allowed for a comprehensive data evaluation, integrating detailed qualitative findings with robust quantitative evidence.

Theory triangulation involves applying multiple theoretical frameworks to analyse the data. Specifically, Brady's Model and the Comparative Education Model were utilised to frame the study's analysis. Brady's model provided a structured approach to understanding educational frameworks, while the comparative education model allowed for the analysis and comparison of educational systems across different contexts. This theoretical diversity enabled a more nuanced interpretation of the data, preventing the findings from being constrained by a single theoretical perspective.

3.8.1 Conclusion

Multimodal research is a fluid methodology that employs multiple essential methods, demonstrating that research operates within a clearly defined philosophical framework through data triangulation. Being aware of the different methods enables the researcher to observe the data systematically. It is employed within the context of the research question and the observable variations in the data. Multimodal research is also recognised as being dynamic due to the multiplicity of research methods. Due to

the dynamic and flexible nature of multimodal research, this methodology can effectively respond to the growth of paramedicine research and is adaptable to the specific context in which it is applied. Therefore, due to the evolution of paramedicine's scope of practice and education, the dynamism of qualitative description research allows paramedic researchers a process that supports contextual awareness and moment formation.

The methodology outlined in this study provides a robust foundation for examining the complexities of paramedicine education and accreditation across a diverse array of sources. By integrating literature reviews, document analysis, comparative educational models, and expert consensus through the Delphi process, the research design facilitates a multidimensional understanding of the key themes, frameworks, and academic perspectives central to paramedic competency and curriculum development. Transitioning from the methodology to the results, the following chapter presents the findings from this extensive analysis, illustrating how these diverse sources collectively inform the current and evolving landscape of paramedicine education.

Chapter 4: Results

4.1 INTRODUCTION

This chapter provides an overview of the five peer-reviewed publications that collectively form the core of this doctoral research. Together, these studies investigate the intersections between paramedicine education, professional capabilities, regulation, and curriculum development across national and international contexts. Each paper contributes unique insights into how paramedicine education can be strengthened to ensure graduate readiness, meet regulatory requirements, and adapt to the evolving healthcare landscape.

Presented as standalone chapters, the five publications are detailed in Chapters Five through Nine. Each explores a distinct but interrelated aspect of paramedicine education and its alignment with practice expectations.

Chapter Five presents the first publication, "An Anglosphere Comparison of Paramedicine Regulatory Frameworks and the Influence on Curricula." This study adopts a descriptive-comparative approach to examine how differing regulatory structures across five countries influence accreditation processes, curriculum design, and educational outcomes in paramedicine. By extending Brady's model and applying the Comparative Education framework, the paper underscores the vital role of regulation in shaping educational pathways and professional expectations. It highlights the need for collaborative dialogue between regulatory bodies, education providers, and the paramedic profession to ensure curricula reflect the realities of contemporary practice.

Chapter Six features the second publication, "Exploring the Alignment Between Paramedicine's Professional Capabilities and Competency Frameworks for Current and Evolving Scopes of Practice: A Literature Review." This review critically examines how national and international competency frameworks correspond with the professional capabilities defined by the Paramedicine Board of Australia. Drawing on academic and grey literature, the study maps these competencies to evolving scopes of practice and emphasises the central role of accreditation in ensuring consistent

standards. This chapter highlights the need for curricula to be evidence-informed and future-focused, supporting the adaptability and preparedness of graduates.

Chapter Seven introduces the third publication, "Exploring Paramedicine Models of Care: A Novel Macro Analysis Using the RESPIGHT Framework." Through a targeted literature review and conceptual analysis, this paper explores the changing models of paramedic care, particularly in rural and remote settings. It proposes the RESPIGHT framework as a tool for evaluating the comprehensiveness of curricula in preparing graduates for expanded scopes of practice. The chapter argues that curriculum design must not only respond to immediate clinical needs but also anticipate broader public health and systemic challenges.

Chapter Eight presents the fourth publication, "Mapping the Evolution of Paramedicine Education." This research uses a sequential meta-synthesis and Delphi methodology to explore how Australian paramedicine curricula have developed since 2018. Drawing on input from 68 paramedic academics and analysing curricula from 18 institutions, this study identifies key components necessary for preparing graduates for primary healthcare roles. It reveals both macro-level alignment and micro-level inconsistencies, offering valuable recommendations for refining curricula to improve coherence and clinical readiness.

Chapter Nine concludes this series of studies with the fifth publication, "Frameworks That Guide Curriculum Development in Australian Higher Education." This work addresses a significant gap in current practice: the lack of comprehensive, curriculum-specific guidance from accrediting bodies. Through discourse analysis and systematic review, the paper identifies frameworks that can better support educators in translating accreditation requirements into effective curriculum design. It calls for a more integrated and research-informed approach to curriculum development that aligns educational content with the realities of paramedicine practice.

Collectively, the five studies contribute a robust body of knowledge that advances our understanding of the complex interplay between regulation, education, accreditation, and professional practice in paramedicine. This chapter serves as a bridge between the broader conceptual foundation laid out in earlier chapters and the detailed empirical investigations that follow. The structure adopted in Chapters Five through Nine reflects the strategic layering of this doctoral research: from exploring international regulatory differences to analysing national competency frameworks,

evaluating emerging models of care, mapping curriculum evolution, and ultimately proposing new directions for curriculum design in paramedicine.

Transitioning back to Paper One, the study highlights that a multilateral approach involving paramedic services, regulatory authorities, and tertiary institutions is essential to align curricula with the evolving scope of practice. The need for collaboration across these sectors ensures that educational programs remain responsive to the profession's changing demands, producing competent and adaptable paramedics.

Building on these insights, the following chapter will delve deeper into a published study that examines the variations in regulatory structures, the factors influencing these differences, and their subsequent impact on paramedic curricula. Employing a descriptive-comparative approach, the study utilises a modified Brady's model and extends the Comparative Education model to analyse paramedic accreditation processes across five countries. By examining the intricate relationship between regulatory frameworks and curricula, this research makes a significant contribution to understanding how paramedicine adapts to the profession's dynamic nature.

Chapter 5: An Anglosphere Comparison of Paramedicine Regulatory Frameworks and the Influence on Curricula: A Descriptive Comparative Review

Weber, A., Devenish, S. & Lam, L. An Anglosphere comparison of paramedicine regulatory frameworks and the influence on curricula: A descriptive comparative review. Paramedicine, (April 2024). https://doi.org/10.1177/27536386241249177 .

This chapter focuses on a published study that examines variations in regulatory structures, the factors influencing these variations, and their impact on paramedic curricula. The study employs a descriptive-comparative approach, utilising a modified Brady's model and extending the Comparative Education model to examine paramedic accreditation processes, curricula, and syllabi across five countries. The overarching aim is to unravel the intricate relationship between regulatory frameworks and curricula, shedding light on how these structures adapt to the evolving nature of paramedicine.

The evolving landscape of paramedicine education in Australia necessitates a critical examination of the relationship between regulatory frameworks and curriculum design. As paramedicine has transitioned from a vocationally oriented field to a registered health profession under the National Registration and Accreditation Scheme (NRAS) in 2018, the educational structures supporting paramedic training have undergone significant transformation. Accreditation frameworks play a crucial role in ensuring that graduates meet professional competency standards; however, they do not prescribe specific curricular content, resulting in considerable variability across institutions. This chapter examines these complexities by drawing upon the findings of the paper "An Anglosphere Comparison of Paramedicine Regulatory Frameworks and Their Influence on Curricula," which explores how regulatory structures in

Australia compare to those in other jurisdictions, notably the United Kingdom, Canada, and the United States.

This chapter builds upon the overarching themes of this thesis by situating accreditation processes within the broader discourse of curriculum development in paramedicine. The thesis as a whole seeks to critically analyse the extent to which paramedicine education under the NRAS effectively prepares graduates for contemporary and future healthcare demands. The comparative analysis presented in the included paper serves as a key component of this inquiry, offering insights into international best practices and highlighting areas where the Australian model may benefit from reform. Specifically, the paper identifies the tension between competency-based accreditation and the need for comprehensive curricular frameworks that address emerging healthcare competencies such as primary care, interprofessional collaboration, and leadership.

A central theme in this research is the alignment (or misalignment) between accreditation standards and curriculum development. While accreditation is essential for maintaining professional standards and public safety, it is not inherently designed to dictate the full breadth of educational content required for modern paramedic practice. This is particularly evident in the findings of the included paper, which demonstrate that while Australian accreditation bodies ensure a high baseline competency, they allow for significant institutional discretion in curriculum design. This discretion has led to inconsistencies in how universities integrate essential healthcare domains beyond emergency response, such as community paramedicine and health system governance.

Furthermore, the paper's comparative approach provides a valuable lens through which to assess the strengths and limitations of the Australian model. By examining regulatory frameworks in the UK, Canada, South Africa and the US, the study highlights how structured curricular models in certain jurisdictions foster a more uniform and well-rounded educational experience for paramedic students. These international insights are particularly relevant given the expanding scope of paramedic practice in Australia, which increasingly demands skills in chronic disease management, telehealth, and interdisciplinary care. The findings suggest that while accreditation ensures competency, additional curricular guidelines could enhance the consistency and comprehensiveness of paramedicine education across Australia.

In synthesising these findings within the broader thesis, this chapter reinforces the argument that accreditation alone is insufficient to prepare paramedic graduates for contemporary practice fully. Instead, a more structured yet flexible curricular framework is needed—one that aligns with accreditation requirements while addressing the profession's evolving demands. This discussion lays the groundwork for the subsequent analysis, which further examines potential curriculum reforms and strategies for bridging the gap between accreditation standards and the diverse educational needs of paramedic students in Australia.

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Paramedicine
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An Anglosphere comparison of paramedicine regulatory frameworks and the influence on curricula: A descriptive comparative review

Anthony Weber[1], Scott Devenish[2] and Louisa Lam[3]

Abstract

Paramedicine is a constantly evolving field, with paramedic education programmes needing to be adaptable to keep up with changes in the scope of practice. Regulatory frameworks are crucial in guiding university programmes, providing students with the knowledge, skills, and professional attributes necessary to be safe and competent practitioners. This study aimed to identify variations in regulatory structures, the factors that influence those variations, and how they influence curricula. A descriptive-comparative approach was taken to examine paramedic accreditation processes, curricula, and syllabi across five countries using a modified Brady's model and extending the Comparative Education model. The findings suggest that paramedic services, regulatory authorities, and tertiary institutions must adopt a multilateral approach to recognise paramedicine's evolving scope of practice. All three stakeholders are responsible for aligning regulatory frameworks with industry needs and providing curricula guidance to tertiary institutions. This approach will enable paramedic education programmes to remain relevant and adaptable to changes in the field, ensuring that graduates are safe and competent practitioners. In conclusion, this study highlights the need for a collaborative effort between paramedic services, regulatory authorities, and tertiary institutions to recognise paramedicine's evolving scope of practice. The need for recognition of this evolution in both regulatory frameworks and curricula is a significant concern, and a multilateral approach is required to address this issue. This study provides valuable insights into the factors that influence variations in regulatory structures and their influence on curricula.

Keywords

paramedicine, paramedic education, regulatory frameworks, curriculum variation, comparative education, scope of practice

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Introduction

Paramedicine is an ever-evolving profession and requires adaptable education programmes that align with the industry's changing scope of practice. There are different models of care of paramedic practice internationally, the Anglo-American model, the Franco-German model, and the hybrid models.[1] Despite the similarities in paramedic scopes of practice in the five core countries of the Anglosphere and South Africa as the sixth country outside of the Anglosphere, variations in educational requirements and regulatory frameworks exist internationally, with considerable diversity.[2] South Africa was included for its alignment with the models of care,

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scopes of practice, and education found in Australia and the USA. Achieving standardised scopes of practice and registration across different countries has been the vision of many paramedic organisations.[3–5] Yet, the differing regulatory frameworks and education of paramedics globally, along with variations of curricula within countries themselves, complicate any standardisation attempts. Consequently, regulatory frameworks guiding paramedicine curricula must be contextualised within the nation, and factors influencing the variations in approach and how they influence curricula must be considered.

This paper aims to synthesise regulatory structures and the factors that influence curricula. The paper envisions a future of international models of paramedic education, regulation, and practice. To achieve this, the regulatory frameworks that guide paramedicine curricula must be reviewed and aligned with industry needs while advising tertiary institutions. This will require a multilateral approach involving paramedic services, regulatory authorities, and tertiary institutions.

The differences in regulatory frameworks and education of paramedics globally and variations of curricula within countries themselves make it challenging to achieve standardised scopes of practice and registration across different countries. In addition, the global variations in paramedicine education qualifications range from 3- to 4-year baccalaureate degrees, 1-year certificates, and 2-year diplomas to single non-award in-house programmes run over a certain amount of time. Although entry-level degree programmes exhibit variations in nomenclature, duration, and curriculum, there needs to be conformity in national and international universal education standards. This can be attributed to the diverse regulatory frameworks within the educational sector.

Furthermore, paramedicine is regulated differently across the Anglosphere, with some countries introducing statutory regulations ensuring safe and competent paramedics. In contrast, others have no regulation or regulatory mechanisms from governments. For example, the Australian Health Practitioner Regulation Agency (Ahpra) regulates paramedics in Australia, while the Health and Care Professions Council (HCPC) regulates paramedics in the United Kingdom.

Given the ability of students to migrate to become paramedics in different countries, the various regulatory and education frameworks may pose a barrier for graduates.[6] Thus, reviewing the paramedicine regulatory frameworks and their influence on curricula requires consideration of national and international perspectives to ensure robust guidance for decision-makers of regulatory frameworks and tertiary institutions.

This research paper aims to delineate the differences in regulatory structures and the underlying factors contributing to such variations and analyse their impact on paramedic curricula. The paper envisions a prospective scenario where paramedic education, regulation, and practice can be harmonised internationally by adopting standardised models. Achieving this vision necessitates a collaborative and multilateral effort among paramedic services, regulatory authorities, and tertiary institutions.

Methodology

An in-depth analysis of international paramedic regulatory frameworks and education is crucial to understand the variations in regulatory structures, the factors influencing these variations, and their impact on curricula. This review of curriculum comparison aligns with the report undertaken by Willis et al. (2009), who identified the need for national and international research and grey literature on contemporary developments in paramedic education that provide best practice models for the twenty-first century.[7] We conducted a content analysis of international documents to achieve this aim, explicitly focusing on the five core countries in the Anglosphere (Australia, New Zealand, the United Kingdom, Canada, and the United States) and South Africa. These countries were selected due to their developed status, close cultural, diplomatic, educational, and military links, and similar paramedic models of care.

We adopted a descriptive-comparative approach, utilising a modified version of Brady's model and a comparative education approach. The first three stages of Brady's model – description, interpretation, and juxtaposition – were applied. The Brady Model provides a systematic and comprehensive approach to analysing paramedicine curriculums. This structured framework ensures a thorough examination of university programmes, offering valuable insights into the nuanced landscape of paramedicine education. The comparative education model involves analysing and comparing educational systems across several countries and has been successfully utilised in nursing education comparative research.[8]

In the description stage, we gathered information on paramedic curricula across the six countries by reviewing grey literature such as university handbooks, accreditation documents, and curriculum renewal documents. We also reviewed documents from government bodies, professional organisations, and statutory bodies related to the six countries to find comparable documents that linked paramedic curricula internationally. In the interpretation stage, we collated and charted the collected information from each of the six countries in tables and figures. The third stage, modified from Brady's model, involved an in-depth comparison of regulatory frameworks and education across each country. This stage allowed for a thorough analysis and comparison of the regulatory frameworks and education of paramedics across different countries and is discussed in detail in this paper.

Comparative education is an effective evaluative tool in creating educational programmes as it takes the strengths of one system and incorporates them into another.[9] Comparative education has been used internationally in

nursing education to identify dynamic educational systems and comparisons and disparities in education models, similar to paramedicine.[10] In this study, the first three stages of Brady's model are incorporated into the findings section, while the fourth stage is represented in the recommendations section. The modified version of Brady's model and comparative education approach in this study provides a valuable framework for future research in paramedic education.

Findings

Australian context

Regulatory framework. In 2018, paramedicine became a nationally regulated profession, the fifteenth health profession regulated by the Australian Health Practitioner Regulation Agency (Ahpra), with paramedics registered with the Paramedicine Board of Australia (PBA). Like the Council of Ambulance Authorities, the PBA has published standards expected of registered paramedics and has implemented them as professional capabilities for registered paramedics. The competency standards and professional capabilities define the core competence required for paramedic practice (Table 1).[11,12] National registration bodies such as the PBA work to improve patient protection by ensuring only those paramedics working within a scope of practice are registered; just as important is the professional identity registration provides paramedics.[13]

Education. A search was conducted on the Australian Health Practitioner Regulation Agency (Ahpra) website for Australian undergraduate pre-registration paramedicine programmes leading to registration.[14] Twenty-three programmes of study revealed entry-level paramedic qualifications with varying nomenclatures and study durations available across 19 universities. There were 10 universities with the nomenclature containing Paramedic, Paramedicine or Practice, and seven qualifications had terminology that included Science, Paramedic Science or Health Science. Two universities' qualifications were dual degrees with nursing, while there were five qualifications at either an Honours or post-graduate Australian Qualifications Framework (AQF level), Table 2.

New Zealand context

Regulatory framework. The regulation of paramedicine as a profession is crucial to ensuring that the highest standards of practice and care are upheld. In New Zealand, the Health Practitioners Competence Assurance (HPCA) Act (2003) was introduced to regulate healthcare professions, including paramedicine.[15] With effect from 1 January 2020, paramedics were officially recognised and registered under the updated HPCA Act (2003).[16] As part of this process, the paramedic council in New Zealand, Te Kaunihera Manapou, has been established to develop the scope of practice for paramedics under the Act.

The Te Kaunihera Manapou has embraced the clinical competence standards developed by the PBA.[17] This commendable decision highlights the importance of international collaboration and standardisation in regulating paramedicine. This signifies an acknowledgement of the need for a unified effort to ensure that paramedicine's regulatory practices remain up-to-date with the latest developments and advancements in the field.[17] By adopting an integrated approach, it will be possible to establish a consistent framework for regulating paramedicine across the globe, thereby ensuring that the profession can provide safe, effective, and efficient care to patients worldwide.

Table 1. Paramedic competencies and professional capabilities.

Previous Council of Ambulance Authority Professional Competency Standards	Current Paramedicine Board of Australia Professional Capabilities for Registered Paramedics
1. Acts in accordance with accepted standards of conduct and performance	Domain 1: professional and ethical conduct
2. Makes informed and reasonable decisions	Domain 2: professional communication and collaboration
3. Demonstrates professional autonomy and accountability	Domain 3: evidence-based practice and professional learning
4. Develops and maintains professional relationships	Domain 4: safety, risk management, and quality assurance
5. Demonstrates the knowledge and understanding required for practice as a paramedic	Domain 5: paramedicine practice
6. Operates within a safe practice environment	
7. Identifies and assesses health and social care needs in the context of the environment	
8. Formulates and delivers clinical practice to meet health and social care needs within the context of the environment	
9. Critically evaluates the impact of, or response to, the paramedics actions	

Table 2. Australian universities offering paramedic Bachelor programmes.

University	Nomenclature	Duration
Undergraduate studies		
Australian Catholic University	Bachelor of Nursing / Bachelor of Paramedicine	4 years full-time or equivalent part-time
Australian Catholic University	Bachelor of Paramedicine	3 years full-time or equivalent part-time
Central Queensland University	Bachelor of Paramedic Science	3 years full-time or 6 years part-time
Charles Darwin University	Bachelor of Paramedicine	3 years full-time
Charles Sturt University	Bachelor of Paramedicine	3 years full-time
Charles Sturt University	Bachelor of Paramedicine (Honours)	3 years full-time
Curtin University	Bachelor of Science (Paramedicine)	3 years full-time
Edith Cowan University	Bachelor of Science (Paramedical Science)	3 years full-time
Flinders University	Bachelor of Paramedic Science	3 years
Griffith University	Bachelor of Paramedicine	3 years
La Trobe University	Bachelor of Paramedic Practice with Honours	4 years
Monash University	Bachelor of Emergency Health and Paramedic Practice	3 years full-time
Monash University	Bachelor of Paramedicine	3 years
Queensland University of Technology	Bachelor of Nursing / Bachelor of Paramedic Science	4 years
Queensland University of Technology	Bachelor of Paramedic Science	3 years
University of Southern Queensland	Bachelor of Paramedicine	3 years
University of Tasmania	Bachelor of Paramedic Practice	2 years
University of the Sunshine Coast	Bachelor of Paramedic Science	3 years
Victoria University	Bachelor of Paramedicine	3 years
Western Sydney University	Bachelor of Health Science (Paramedicine)	3 years
Post-graduate studies		
Charles Sturt University	Graduate Diploma Clinical Practice (Paramedic)	1-year full-time
Federation University Australia	Graduate Diploma of Paramedicine	1-year duration
University of Notre Dame Australia	Graduate Diploma of Paramedicine	1-year duration

In light of these developments, it is important to recognise the significance of effectively regulating paramedicine to promote public safety and trust. As paramedicine continues to evolve and expand, the role of regulatory bodies like Te Kaunihera Manapou in maintaining education standards and fostering innovation will be essential to ensure that the profession continues providing high-quality care to needy patients.

Education. The fundamental objective of the Te Kaunihera Manapou Paramedic Council is to ensure the protection of public safety. To fulfil this goal, as mandated by the Health Practitioners Competence Assurance Act 2003, the council regulates paramedic qualifications and establishes educational benchmarks for institutions that offer paramedic programmes.[17] Auckland University of Technology and Whitireia New Zealand have been granted the status of authorised providers of the Bachelor of Health Science in Paramedicine. This privilege was valid until March 2022.

The United Kingdom context

Regulatory framework. The United Kingdom (UK) National Health Service (NHS) is accountable for monitoring and governing ambulance services. The NHS is the central governing authority for ambulance services in implementing its national health policy.[18] Paramedics in the UK are regulated by the HCPC and have been registered with the HCPC longer than their counterparts in Australia. Nonetheless, paramedics in the UK have yet to embrace university-based education fully.

In the UK, paramedics must be registered with the HCPC, which ensures that paramedics meet the required standards of proficiency and conduct. HCPC maintains a register of paramedics to protect the public by ensuring that only competent and ethical practitioners provide healthcare services.[19]

Education. Within the United Kingdom (UK) paramedic scene, the professional body, the College of Paramedics, has been a strong supporter and reformer for changes in education that evolve when there are changes to the delivery model for paramedicine.[19] Initially, Paramedic education in the UK involved in-house, apprenticeship-style training. As an integral component of the National Health Service reforms, there was a paradigm shift in the educational training of paramedics, which transitioned towards a more academic orientation through establishing university-based undergraduate programmes.[20] In reaction to the displacement of short-course service-delivered

training programmes by baccalaureate programmes, the College of Paramedics created a paramedic curriculum guide that offered higher education institutions a comprehensive model for developing paramedic students and a consistent curriculum framework.

The standardised approach to paramedic education was developed in response to the changing scope of paramedics' practice, allowing students the clinical judgement skills to manage patients safely and provide the confidence and independence to be competent as new practitioners.[21] Achieving standardised content delivered across all higher education institutions in the United Kingdom, the following are fields of study recognised by the College of Paramedics: Physical Sciences, Life Sciences, Social, Health and Behavioural Sciences, Clinical Sciences, Ethics and Law, Patient Assessment, Care Delivery, Leadership Attributes, Public Health and Wellbeing, all of these domains supported by Evidence-Based Practice and Research (Figure 1).[21]

The Canadian context

Regulatory framework. Provincial authorities oversee paramedic registration and regulation in Canada. The Paramedic Association of Canada (PAC) had developed the National Occupational Competency Profile (NOCP) to establish a standardised framework for paramedicine. This document outlined the necessary competencies and tasks for paramedics at different clinical levels. The NOCP served as a professional consensus and provides a uniform reference for Canadian jurisdictions.[22] Each province has its own regulatory body responsible for ensuring that paramedics meet the required standards of practice and conduct. In addition, provincial paramedic regulatory bodies determine the scope of practice for paramedics within their respective jurisdictions.

Figure 1. UK curriculum model.

In Canada, provincial authorities empower paramedic regulators to grant registration, licensure, or certification, allowing individuals to practice as paramedics. The specific requirements and standards for regulation, registration, licensing, and certification vary across provincial jurisdictions.

As of 2023, the NOCP has been replaced by the National Occupational Standard for Paramedics (NOSP), managed in partnership with the CSA Group. This new standard is developed following accredited processes established by the Standards Council of Canada, providing updated guidelines for paramedic practice in Canada.

Paramedics in Canada operate under two distinct regulatory models: self-regulated or government-regulated. Provinces such as Alberta, Saskatchewan, Manitoba, Nova Scotia, and New Brunswick follow a self-regulated approach. Meanwhile, British Columbia, Ontario, Quebec, Prince Edward Island, and Newfoundland and Labrador adhere to government regulation. Paramedics in the Territories are not yet subject to regulation.[22]

The NOSP emerges as a vital framework. This innovative system establishes a standardised approach to paramedicine practice across Canada, delineating competencies and tasks expected at different clinical expertise levels. The NOSP becomes a cornerstone, ensuring a consistent standard of care for all Canadians, irrespective of their location, by setting clear performance expectations for paramedics.

Crucially, the NOSP doesn't just exist in isolation; it continues to play a pivotal role as a guiding reference for regulatory bodies. These bodies will leverage the NOSP to shape educational programmes, certification standards, and licensure requirements, aligning them with the outlined competencies. Consequently, the NOSP becomes instrumental in harmonising paramedic education and practice throughout Canada, guaranteeing that all paramedics adhere to the same standards of excellence and professionalism, Table 3.

Table 3. Paramedic National Occupational Competency Profile.

Competency Area 1	Professional responsibilities
Competency Area 2	Communication
Competency Area 3	Health and safety
Competency Area 4	Assessment and diagnostics
Competency Area 5	Therapeutics
Competency Area 6	Integration
Competency Area 7	Transportation
Competency Area 8	Health promotion and public safety

Education. In Canada, the education of paramedics is primarily overseen at the provincial level by the regulatory bodies responsible for ensuring that paramedics meet the required standards of practice and conduct.[23] While there has yet to be a standardised approach to the education of paramedics across Canada, most provinces have implemented a competency-based approach to education. This approach ensures that paramedics possess the knowledge, skills, and abilities to provide safe and effective patient care.

The educational requirements for paramedics vary depending on the level of practice.[23] Entry-level paramedics typically complete a diploma or certificate programme at a community college or technical institute. Advanced care paramedics usually have a higher level of education and may have completed a bachelor's degree or advanced diploma in paramedicine.

The United States of America context

Regulatory framework. The regulatory landscape governing paramedics in the United States is intricate and multifaceted, with oversight extending from both federal and state levels. While the National Highway Traffic Safety Administration (NHTSA) assumes a pivotal role in establishing and promoting nationwide standards for emergency medical service (EMS) systems, encompassing paramedic education and certification, it's important to note that NHTSA's influence lies more in the realm of guidance and coordination rather than direct regulatory control.[24] NHTSA primarily operates by convening experts and providing financial support through federal grants.

A significant milestone in this domain occurred in 2000 when NHTSA unveiled the EMS Education Agenda of the Future: A Systems Approach, which introduced five foundational pillars for EMS development.[25] These pillars comprise the EMS Core Content, EMS Scope of Practice, EMS Education Standards, National Certification, and Paramedic Program Accreditation. Among these, the National Registry of Emergency Medical Technicians (NREMT) has emerged as a crucial player, assuming responsibility for certifying entry-level competence for EMS practitioners across all levels, including paramedics. With over 500,000 registered clinicians under its purview, the NREMT has solidified its role in this capacity.[25] It's worth clarifying that neither the NREMT nor the National Association of Emergency Medical Technicians (NAEMT) have pursued licensure endeavours. The authority to grant licensure rests exclusively with individual state EMS agencies.

Addressing the variability in scope of practice across states, the EMS Compact emerges as a noteworthy development. This Compact encompasses more than half of all states, allowing for licensure reciprocity among participating states. This means that paramedics with licensure in one state can seamlessly practice in another state within the Compact, fostering mobility and continuity of care.

Education. In the past, the education of paramedics in the US has faced significant challenges, as highlighted in the review of the literature. This led to a concerted effort to standardise the training curriculum, involving collaboration among diverse stakeholders, including federal and private EMS authorities and legislative bodies.[26] This evolution reflects a commitment to enhancing the paramedic profession and is mirrored in the complexity of the curriculum, mirroring the multifaceted nature of paramedic practice within the country.

The process of consolidating 500 distinct training programmes into a unified and standardised curriculum has been a necessary endeavour. This transformation emerged from meaningful cross-disciplinary discussions, a fruitful collaboration involving both public and private EMS authorities, and legislative modifications. The newly introduced areas of study within paramedic education in the United States are anticipated to elevate the standards of the profession. The intricacy of the curriculum documents mirrors the intricacies of the scope of practice across the nation. Guidelines for these scopes of practice are established within legal frameworks, regulatory statutes, and policy documents. While certain states incorporate precise language within their legal, regulatory, or policy documents, others adopt a different approach known as 'incorporation by reference' by referring to a separate document.[26]

The Practice Model plays a pivotal role in establishing a mechanism to achieve consistency in EMS scopes of practice among different states.[27,28] Through this model, the skills and responsibilities undertaken by paramedics in the United States are defined and aligned with specific certifications and educational prerequisites. It is important to highlight the role of the Commission on the Accreditation of EMS Programs (CoAEMSP) in this context. CoAEMSP holds the responsibility of verifying and validating paramedic programmes across all states within the US, including those within the US military.[29] This accreditation body serves as the benchmark for paramedic programmes to adhere to, superseding the influence of NHTSA.[26] For a paramedic student to attain certification and eventual licensure within a state, it is imperative that they graduate from a programme approved by CoAEMSP, or from one that has received an approved letter of intent from CoAEMSP.

The review also identified that this curriculum for courses or study programmes was typically 1000–1200 h. Table 4 identifies the domains of study offered in the USA and South Africa. The literature identified that the USA EMS had influenced other countries, such as the United Kingdom, South Africa, and the Middle East. In particular, South Africa mirrored the United States EMS.

The South African context

Regulatory framework. During the late 1980s in South Africa, the registration of paramedics was a pivotal

Table 4. USA and South African national curriculum (National Highway Traffic Safety Administration, 2009).

Preparatory			
EMS systems	Research	Workforce safety and wellness	Documentation
EMS system communication	Therapeutic communication	Medical/legal and ethics	
Comprehensive knowledge			
Anatomy and physiology	Medical terminology	Pathophysiology	Life span development
Principles of pharmacology	Medication administration	Emergency medications	Shock and resuscitation
Fundamental knowledge			
Public health	Principles of safely operating a ground ambulance	Incident management	Multiple casualty incidents
Air medical	Vehicle extrication	Hazardous materials awareness	Mass casualty incidents due to terrorism and disaster
Complex knowledge			
Airway management	Respiration	Artificial ventilation	
Scene and patient assessment findings			
Scene size-up	Primary assessment	History taking	Secondary assessment
Monitoring DEVICES	Reassessment	Medical overview	Neurology
Abdominal and gastrointestinal disorders	Immunology	Infectious diseases	Endocrine disorders
Psychiatric	Cardiovascular	Toxicology	Respiratory
Hematology	Genitourinary/renal	Gynecology	Non-traumatic musculoskeletal disorders
Diseases of the eyes, ears, nose, and throat	Trauma overview	Bleeding	Chest trauma
Abdominal and genitourinary trauma	Orthopedic trauma	Soft tissue trauma	Head, facial, neck, and spine trauma
Nervous system trauma	Special considerations in trauma	Environmental emergencies	Multi-system trauma
Obstetrics	Neonatal care	Pediatrics	Geriatrics
Patients with special challenges			

EMS: emergency medical service.

development that facilitated the recognition of paramedicine as a legitimate healthcare profession. The Health Professions Council of South Africa (HPCSA) established the Professional Board for Emergency Care (PBEC), which mandated that all paramedics be registered before practising in the country.

However, despite this progress, the global evolution of paramedicine has also impacted South Africa. The changing nature of paramedicine and advancements in technology and clinical practice has necessitated ongoing education and training for paramedics to remain current and competent. As a result, South Africa, like other countries, has had to continually adapt its paramedic education and certification programmes to meet the evolving demands of the profession.[30]

Over the past three decades, paramedic education in South Africa has progressed from short-course training to undergraduate university qualifications, as supported by the National Emergency Care Education and Training (NECET) policy. This policy, in turn, seeks to advance the transformation of Paramedicine and to provide clinical practice guidelines to ensure quality patient care in South Africa, as evidenced by the work of Sobuwa and Christopher (2019).

In South Africa, the scope of practice for paramedics aligns with their educational framework, which includes different levels of clinicians. The amalgamation of clinical levels comprises five distinct scopes of personnel practice, corresponding to the mix of short-course and higher education qualifications.[30] As with other Western countries, the changing demands on the healthcare system and the evolving roles of Paramedicine and the medical evidence supporting clinical care necessitate the educational framework to follow these scopes of practice.

Education. The South African qualifications authority registers paramedics programmes at a Bachelor's degree level. This follows a three-tier approach to the education of paramedics in South Africa. The National Qualifications Sub-Framework for South African paramedics involves an entry-level Higher Certificate, then a Diploma, then a Bachelor's degree.[30] The purpose of the registered qualifications is to maintain consistency in the units of study provided by institutions to meet the competency standards of students before employment.[31] Their qualifications have followed the USA national curriculum and are consistent with 4-year Bachelor's degrees offered in the USA.[31] In

Table 5. South Africa emergency care qualification framework (adapted from Sobuwa & Christopher, 2019).

Qualification		Duration	Clinical level
Post-graduate	PhD Emergency Medical Care (EMC)	2 years	Research-based qualification
	Masters EMC	1 year	
Undergraduate	Bachelor EMC	4 years	Emergency Care Practitioner
	Diploma Emergency Care (EC)	2 years	Emergency Care Technician
	Higher Certificate EC	1 year	Emergency Care Assistant

addition to the U.S.A, the South African Curriculum focuses on the basic medical sciences such as anatomy and physiology, paramedic-specific medical and trauma conditions, and a wide range of related paramedical disciplines such as rescue and communications.[32] Table 5 identifies the qualifications per the Emergency Care Qualification Framework for South Africa.

Summary of findings

The three-stage approach modified from Brady's model was to expand and compare regulatory frameworks and education across the Anglosphere counties. It included South Africa due to the similarity in models of care, scopes of practice, and education to Australia and the USA. Internationally, comparative education identifies educational systems that recognise the comparisons and disparities between education models.[10] Comparative education is a useful evaluative tool for creating educational programmes by taking one system's strengths and incorporating them into another.[9]

The analysis and comparison against international paramedic regulatory framework and education standards identified differences in the regulatory frameworks and various undergraduate paramedic degrees, and it has also demonstrated varying time frames in which ambulance organisations, training providers and universities undertake paramedic education (Table 6). The review's scope did not encompass specialist roles such as Critical Care Paramedics, High Acuity Response Unit Paramedics, Flight Paramedics, or Extended Care Paramedics and Community Paramedics.

Discussion

Paramedicine education and regulation are critical aspects of ensuring the health and safety of communities. According to the World Health Organisation (2019), an evidence-based and contemporary national accreditation scheme can be effective for health professional education, including paramedicine.[33] However, despite discussions by paramedics' professional organisations, achieving global accreditation standards for paramedic education has been challenging, given the global variations in curricula.

The lack of a standardised curriculum is mainly because paramedics worldwide need to be registered, making it difficult to sustain a standard-based curriculum. In Australia, paramedic education has evolved more rapidly than in other countries, with almost all education currently at the baccalaureate level. In the United Kingdom and South Africa, education is moving entirely into higher education, with university-based diplomas and 3-year and 4-year baccalaureate programmes. In contrast, paramedic education in the United States and Canada remains divided, with a historical emphasis on independence across different states and provinces.

In Australia, higher education institutions provide curriculum guidance, strengthening paramedic professional identity and providing educational reform for Paramedicine.[34] Education is at the forefront of identifying Paramedicine as a profession, leading to higher level educational qualifications, prospectively or retrospectively, as seen in Australia and New Zealand.[35] The nursing profession provides an excellent example of establishing a bachelor's degree as an initial qualification for nurses, with specialisations such as midwifery, intensive care, and emergency nursing provided at the post-graduate level.

There are provisions for regulating paramedicine in the United States and Canada. However, the government still needs concrete federal or state-level regulations or rules. Instead, the regulation of paramedicine in these countries is primarily carried out through various systems and processes.

In the United States, the regulation of paramedicine is primarily the responsibility of individual states. Each state has its own regulatory body, typically a state EMS office or board, responsible for establishing and enforcing rules and regulations for paramedics operating within that state's borders. The specific requirements for certification and licensure can vary widely from state to state, but generally, they involve a combination of education, training, and clinical experience.

Similarly, in Canada, the regulation of paramedicine is primarily carried out at the provincial level. Each province has its own regulatory body responsible for establishing and enforcing rules and regulations for paramedics operating within that province's borders. The PAC has also developed the NOCP, which outlines the competencies and tasks that paramedics should possess at various clinical levels, ensuring a consistent care level across Canada.

The regulatory frameworks supporting curricula also vary across countries, with registration being the recognition by the professional regulation body that the paramedic

Table 6. Comparison of paramedic registration and qualifications.

Country	Professional accreditation	Qualification types(undergraduate)	Duration	Clinical level
Australia	Yes Australian Health Practitioner Regulation Agency (AHPRA)	Bachelor degrees Diploma (New South Wales only)	2–4 years 1 year	Ambulance Paramedic, Paramedic 3, Advanced Care Paramedic, Intermediate Life Support (ILS) Paramedic
New Zealand	No	Bachelor degrees	3 years	Intermediate Care Paramedic/Emergency Medical Technician
United Kingdom	Yes Health and Care Professions Council (HCPC)	Full-time approved qualification Student paramedic with an ambulance service and study while you work Degree standard apprenticeship in paramedic science with an ambulance service trust	2–4 years 2 years 2–5 years	Paramedic
Canada	Regulatory frameworks vary from province to province	Certificate level Advanced Diploma level Bachelor degree	8 months in class with 12 days on the ambulance for precepting 3 years[a] 4 years[a]	Primary Care Paramedic Primary Care Paramedic Paramedic
South Africa	Yes The Health Professions Council of South Africa	Bachelor EMC Diploma Emergency Care (EC) Higher Certificate EC	4 years 2 years 1 year	Emergency Care Practitioner Emergency Care Technician Emergency Care Assistant
United States of America	No	Certificate level Associate degree Bachelor degree	6 months 2 years 4 years	EMT EMT/Paramedic Paramedic

[a]Denotes that course length varies across provinces.

student has completed all educational requirements to practice as a paramedic in countries such as Australia and the UK. A recent article identifying the transition of Australian graduates into the United Kingdom determined that parallels occur between the practice and education of paramedics across these two countries.[6] Conversely, licensure by examination is required to practice as a paramedic in countries like the USA.

Paramedicine's globalisation goes beyond Australia and the United Kingdom and should include other Commonwealth countries such as Canada and South Africa. However, lacking evidence-based regulatory frameworks supporting curriculum design leads to poor outcomes and variations in graduate attributes and abilities.[36] Thus, an evidence-based regulatory framework supporting curriculum development can provide minimum standards through graduate competencies or prescriptive curricula development and the continuous evolution of curricula.

Limitations

Several challenges arise when attempting to comprehensively address and compare paramedic regulations, education systems, and credentials across jurisdictions, particularly in places like Canada and the USA. The intricate nature of paramedic regulations in these countries, with their varying breadth and depth, presents a complexity that goes beyond the scope of this paper. Additionally, the heterogeneity of education systems and credentials in these regions, in contrast to more homogenous systems in Australia or the UK, adds another layer of difficulty in presenting meaningful comparisons within the confines of this paper.

Moreover, the lack of a common definition for 'paramedic' across the Anglosphere further complicates comparative analyses. The existence of multiple paramedic levels within jurisdictions, each with its own set of regulatory and education nuances, poses a significant challenge.

Conclusion

In light of the recent registration of paramedicine with the Australian Health Practitioner Regulation Agency (Ahpra) and new guidelines for education standards, the timely comparison of curricular content and regulatory frameworks for entry-level paramedic qualifications has become increasingly important. As such, benchmarking curricula in paramedicine is critical to establish best practices and translate evidence into practice. Previous studies in nursing literature have reported the development of curriculum guidance for higher education institutions through benchmarking best practices.[35] A regulatory framework supporting curricula is crucial to paramedicine as it ensures that graduates are equipped to teach current and evolving practice scopes safely and effectively and are prepared for ongoing contemporary practice.

Through our comparative study, we've identified variations in regulatory frameworks and education within paramedicine globally, potentially influencing current and evolving practice scopes. Further exploration is required to examine consensus on the scope of practice internationally and academic perceptions in curricula. This involves in-depth analyses of various curricula, the professional scope of practice, and the role of education and regulatory frameworks in an expanded scope of practice. Additionally, a multilateral approach aligned with current and evolving practice could be supported by an international accreditation scheme, guiding curricula in higher education institutions. Overall, this research highlights the need for continued investigation and development of paramedicine's regulatory and educational frameworks to ensure practitioners are well-prepared for safe and effective patient care. While creating consistency across the Anglosphere is important, defining our profession and its nomenclature is equally crucial. Furthermore, when defining an international standard of paramedic education, a key decision will be whether graduates are novice learners or work-ready professionals.

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The analysis from Article One – Exploring Paramedicine Models of Care: A Novel Macro Analysis Using the RESPIGHT Framework provides key insights into the evolving landscape of paramedic education in Australia. The study highlights the growing need to integrate community care, primary care, and emergency response within paramedicine curricula, reflecting the profession's expanded role beyond traditional emergency services. By assessing curricula alignment with the RESPIGHT framework, the study identifies potential gaps where graduates may require further training to meet the diverse demands of contemporary healthcare. These findings inform curriculum development by pinpointing areas for improvement and adaptation, ensuring paramedic education evolves alongside the healthcare landscape.

Additionally, this analysis directly supports Objective One by offering a clearer understanding of the historical development and current state of paramedic practice in Australia. It examines how educational, regulatory, and professional frameworks shape the profession, providing a foundation for evaluating the effectiveness of existing curricula in preparing paramedics for their expanding scope of practice.

Objective four is to develop a theoretical basis for future practice, accreditation, and curriculum development linked to these findings. By identifying gaps in current paramedicine education and highlighting emerging trends, the findings support the development of a theoretical basis for future practice, accreditation, and curriculum development. This involves ensuring that paramedic education programs incorporate a broader range of skills and knowledge to meet the evolving needs of healthcare delivery.

In summary, the analysis of paramedicine curricula in Australia offers valuable insights into the alignment with the RESPIGHT framework, potential gaps in education, and implications for future curriculum development to enhance the preparation of paramedics for their evolving roles in healthcare.

In conclusion, this study stresses the vital need for a collaborative effort between paramedic services, regulatory authorities, and tertiary institutions to recognise and adapt to the evolving scope of paramedicine practice. The findings highlight the importance of aligning regulatory frameworks with industry needs and providing clear curricular guidance to educational institutions. This multilateral approach ensures that paramedic education programs remain relevant and adaptable, ultimately producing graduates who are safe, competent, and well-prepared for the dynamic challenges of

the profession. By shedding light on the variations in regulatory structures and their impact on curricula, this study makes a significant contribution to the ongoing discourse on paramedicine education and its future direction.

The following chapter examines published work that explores the relationship between competencies, scope of practice, and accreditation—a cornerstone in ensuring that paramedicine curricula align with the field's diverse demands. This study employs a comprehensive methodology, identifying crucial competencies aligned with contemporary paramedic practice through a narrative review of the literature and a directed search of grey literature. The insights gained were then mapped to the professional capabilities outlined by the Paramedicine Board of Australia.

Utilising a qualitative approach based on content analysis, the study extracts key insights from various documents, examining commonalities across countries and professions. This review underlines the importance of measuring and validating the professional capabilities of paramedic practitioners. By exploring various metrics and competency frameworks and comparing them against national accreditation schemes, the study emphasises the pivotal role of accreditation frameworks in enhancing the quality of paramedicine practice. This chapter delves into the details revealed by the study, shedding light on how accreditation plays a crucial role in shaping the competence and preparedness of paramedic graduates for the dynamic challenges of their profession.

Chapter 6: Exploring the alignment between paramedicine's professional capabilities and competency frameworks for current and evolving scopes of practice: a literature review

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This chapter centres around published work that explores the intricate relationship between competencies, scope of practice, and accreditation—a cornerstone in ensuring paramedicine curricula align with the field's diverse demands.

The regulation of paramedicine education in Australia has undergone significant transformation since the introduction of the National Registration and Accreditation Scheme (NRAS) in 2018. As paramedics have moved into the realm of registered health professionals, ensuring that educational programs align with evolving accreditation standards has become paramount. However, while accreditation frameworks establish minimum competency requirements, they do not prescribe detailed curriculum design, leading to variability in how institutions prepare graduates for professional practice. This chapter contextualises these challenges within the broader scope of this thesis by incorporating findings from the paper, "Exploring the alignment between paramedicine's professional capabilities and competency frameworks for current and evolving scopes of practice: a literature review," which examines the intersections between paramedicine education, accreditation, and regulatory frameworks.

This paper contributes to the overarching research question of this thesis by analysing the extent to which current educational structures support the dynamic and

expanding scope of paramedic practice in Australia. By examining how regulatory mechanisms impact curriculum design, the paper provides insights into both the strengths and limitations of accreditation as a driver of educational quality and consistency. Notably, it highlights gaps in standardised curriculum guidance. It examines how these gaps affect graduate preparedness, particularly in emerging areas of paramedicine, such as primary healthcare, community paramedicine, and interprofessional collaboration.

A core theme explored in this chapter is the tension between competency-based accreditation and the need for a structured yet flexible curriculum framework. While accreditation ensures a baseline level of professional competency, the paper highlights how varying institutional approaches to curriculum design can lead to inconsistencies in key areas of training. This is particularly relevant in the context of Australia's evolving healthcare landscape, where paramedics are increasingly expected to operate in settings beyond traditional emergency response, including primary and urgent care environments.

However, it is important to acknowledge that curriculum variation is not inherently problematic. A standardised curricular framework, while promoting consistency, may inadvertently constrain innovation and responsiveness to local and institutional contexts. Universities differ significantly in how health professional education is delivered, often influenced by their broader faculty structures and academic priorities. Additionally, regional health service needs may warrant tailored curricular approaches, and strict standardisation could suppress necessary adaptability.

Paper three recognises these tensions by highlighting how accreditation can serve as both an enabler and a constraint. While a baseline of professional competencies is essential, the lack of detailed curricular guidance has led to inconsistencies in how programs prepare graduates for emerging areas such as primary healthcare, community paramedicine, interprofessional collaboration, and leadership. These inconsistencies can result in variable graduate outcomes, despite national accreditation requirements.

By comparing paramedicine education and regulatory structures across multiple jurisdictions, the paper provides valuable international perspectives on best practices that could inform Australian curriculum development. The findings indicate that some countries adopt more structured approaches to curriculum standardisation while still

allowing for institutional flexibility, leading to more comprehensive graduate preparation. These insights reinforce the argument that accreditation should be complemented by clear curricular frameworks that ensure consistency in essential domains of paramedicine education.

The discussion in this chapter, informed by the findings of the included paper, contributes to the broader thesis argument that accreditation alone is insufficient in guaranteeing the comprehensive education of paramedic graduates. Instead, a balanced approach is necessary—one that integrates accreditation requirements with structured curricular guidance to address the realities of contemporary paramedic practice. This analysis lays the groundwork for subsequent chapters, which further explore potential strategies for enhancing the curriculum and reforming regulations in Australian paramedicine education.

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RESEARCH Open Access

Exploring the alignment between paramedicine's professional capabilities and competency frameworks for current and evolving scopes of practice: a literature review

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Abstract

Background To adequately prepare graduates for the dynamic demands of paramedic practice, adopting a contemporary educational approach is essential. This involves collaborating to identify crucial competencies through input from industry stakeholders, experienced practitioners, and discipline-specific experts. Accreditation assumes a central role within this framework, serving as a cornerstone to ensure that paramedicine curricula align with paramedics' diverse and evolving professional roles.

Methods A narrative review of the literature and a directed search of grey literature were performed to identify specific developments in paramedicine competencies and scope of practice and mapped to the professional capabilities published by the Paramedicine Board of Australia. In determining a competency map and accreditation's role in a competency framework specific to current and evolving paramedic practice, key documents were analysed using a qualitative approach based on content analysis to identify common traits among documents, countries and other professions.

Results The review process identified 278 themes that were further allocated to 22 major analytical groupings. These groupings could further be mapped to previously reported cognitive, technical, integrative, context, relationship, affective/moral competencies and habits of mind. At the same time, the highest-rated groupings were key competencies of intellectual skills, safety, accountability, clinical decision-making, professionalism, communications, team-based approach and situational awareness. Two groups were represented in the literature but not in the professional capabilities, namely Health and Social continuum and self-directed practice.

Conclusions This review highlights the importance of measuring and validating the professional capabilities of Paramedicine Practitioners. The study explores various metrics and competency frameworks used to assess competency, comparing them against national accreditation schemes' professional capability standards. The findings suggest that accreditation frameworks play a crucial role in improving the quality of paramedicine practice, encompassing

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Paramedicine education.

intellectual skills, safety, accountability, clinical decision-making, professionalism, communication, teamwork, and situational awareness.

Keywords Paramedicine, Competencies, Competency frameworks, Professional capabilities, Accreditation, Evolving scopes of practice

Background

Throughout history, accreditation has been recognised not merely as a mechanism for ensuring the production of safe and competent practitioners and the establishment of minimal educational prerequisites [1]. Recent literature consistently reinforces this perspective [2]. It is imperative to acknowledge that accreditation should not only delineate minimum standards with achievable outcomes but also guarantee perpetual adherence to these educational standards, thus safeguarding the public's welfare. Moreover, accreditation should serve as a catalyst for institutions, compelling them to engage in continuous self-improvement and the evolution of curricula in alignment with the dynamic landscape of practitioner practice [1, 3].

Beyond its advantages for students, higher education, and the general public, accreditation is pivotal in benefiting the respective professions by ensuring the current and future competencies required within practitioners' scopes of practice [4]. Furthermore, accreditation establishes a symbiotic relationship between the profession and educational institutions, standardising curricula and enhancing graduates' preparedness for the workforce [2].

However, the dissenting voices within the discourse on health education accreditation are noteworthy. Critics argue that accreditation may impede curricula' individuality and innovative potential [5]. Additionally, concerns are raised about the associated drawbacks, including escalated costs for institutions, temporal constraints on academic staff, potential student attrition, and the burden of frequently adapting curricula to align with evolving accreditation requirements [6]. While the critics raise valid concerns about the potential drawbacks of health education accreditation, it's essential to recognise the dynamic nature of healthcare disciplines, exemplified by the field of paramedicine. Paramedicine has traditionally been lauded for its adeptness in delivering early interventional emergency pre-hospital care, thereby contributing significantly to reducing morbidity and mortality [7]. However, the evolving landscape of healthcare demands adaptability, prompting paramedicine to expand its scope into primary healthcare.

In this context, accreditation becomes a pivotal consideration. While accreditation processes are designed to ensure and uphold educational standards, their application to a versatile discipline like paramedicine raises pertinent questions. The traditional framework of accreditation, with its emphasis on standardisation, may pose challenges to the inherent flexibility required in paramedicine's evolving scope. The need for adherence to accreditation requirements might introduce constraints on the innovative approaches that paramedicine often employs in response to emerging healthcare needs.

The changing scope of practice in paramedicine is a result of evidence-based practice, where paramedics deliver care in diverse roles and settings, utilising the latest treatments and technology to serve communities effectively [8, 9]. Paramedics have also seen the profession grow in the diversity of clinical care [10], contributing to managing chronic conditions, acute presentations of mental ill-health, and community health assessments [8]. With paramedicine's evolving scope of practice, education can be at the forefront and a driving force behind these new roles.

As the scope of practice in paramedicine rapidly evolves [10], it is essential to make changes in paramedic education. These changes should not only focus on current practices but also consider future practices [11]. Paramedic university education needs to be updated to include the latest skills, knowledge, and competencies reflective of the evolving scope of practice. In essence, the link between practice, competencies, and education is like a chain reaction. Changes in practice necessitate updated competencies, and to develop those competencies, education needs to adapt. It's a dynamic relationship where each component influences and depends on the others to maintain a high standard of care in an ever-evolving field. Therefore, this paper aims to explore the role of paramedic accreditation in ensuring that the evolving scope of practice in paramedicine is met. To achieve this, we will describe the competencies that graduates must possess and the curriculum that aims to develop these competencies, which are suitable for the evolving scope of practice. To provide a comprehensive understanding, we will undertake a narrative review of the relevant literature.

The narrative review aims to assess whether the professional capabilities in paramedicine align with evidence-based practices and are responsive to the dynamic scope of the field. It will examine the framework set by the national accreditation scheme for paramedicine, with a focus on evaluating the Paramedicine Board of Australia's

Professional capabilities for Paramedicine Practitioners. Within the context of this study, Paramedicine Practitioners are defined as paramedics with expanded skills in primary healthcare capabilities. The objective is to determine if these capabilities have been systematically measured and validated in a reliable manner, ensuring they align with current evidence and adapt to the evolving landscape of paramedicine practice.

The PBAs Professional Capabilities are a set of standards developed by the Australian Health Practitioner Regulation Agency (Ahpra) to outline the essential attributes and skills that paramedics need to demonstrate in their professional practice. These capabilities serve as a framework to ensure that practitioners meet the necessary standards of competence and conduct. The development of these professional capabilities often involves a comprehensive process that includes input from experienced paramedics, educators, researchers, and other stakeholders in the field.

In summary, it is contended that the evolving scope of practice necessitates a re-evaluation of the current professional capabilities. The imperative to update these capabilities is underscored by an assertion that accreditation not only ensures the profession's vitality but also enhances the readiness of graduates for the dynamic demands of the workforce. In the context of this discussion, it becomes essential to delineate between competence, competency, and competency frameworks and capabilities for a comprehensive understanding.

Competence, competency, competency framework and professional capabilities

Competence

Epstein & Hundert (2002) define competence as the skilled integration of various elements in daily practice for the benefit of individuals and communities served [12]. The distinction between declarative and procedural knowledge is vital—knowing facts does not automatically equate to competence. Declarative knowledge involves understanding concepts [13], while procedural knowledge is about applying skills [14]. Achieving true competence requires a grasp of both types, especially in healthcare education [15]. However, competence extends beyond knowledge; it embodies the attributes of a profession. Simply knowing a subject doesn't guarantee practical competency. It's essential to bridge the gap between knowledge and its application for safe and competent task performance [16].

Competency

Whiddett's (2003) definition of competency, widely utilized in the development of frameworks, standards, and competency-based education, describes competencies as "behaviors that individuals demonstrate when undertaking job-relevant tasks effectively within a given organizational context" [17]. In the context of traditional higher education, competency tends to be more implicit than explicit [18]. Traditional models assume that completing a degree program implies the acquisition of necessary skills and knowledge. However, these competencies are often not explicitly stated or measured. Unlike traditional models, competency-based education explicitly identifies and measures the specific competencies required by employers or professional organizations, highlighting the need for a more precise assessment of competency levels [18]. The literature now encompasses various higher education health and medical qualifications embracing competency-based education [18–20].

Competency framework

Ensuring healthcare students graduate as competent professionals is a core objective for higher education institutions. This requires the application of competency frameworks to identify and measure competencies [21]. Accreditation bodies often utilize these frameworks to enhance health programs and students' abilities [21]. However, there's a risk of reducing education to a checklist, prioritizing accreditation over students' application of knowledge in real-world scenarios. It's crucial for institutions to use competency frameworks without compromising the broader goal of developing competent healthcare professionals capable of delivering high-quality care to patients.

Professional Capabilities

While competencies are reflective of the foundational skills a paramedic requires, and the competency framework is the roadmap in attaining these skills, generally from novice to mastery level. Professional capabilities are identified as the highest level of achievement in meeting competencies [22]. For example, reaching the "Clinical Decision-Making Expert" capability means not just having individual skills but using them effectively in challenging situations.

Methods

A narrative review was conducted to search for specific competency frameworks for paramedicine and paramedic education. This review builds on the findings from two previous scoping studies that outline competency frameworks for paramedicine and paramedic education [23, 24]. Paramedic education-specific development of standards of practice, competency maps, competency frameworks, competency-based conceptual models and competency assessment tools were selected. It has been previously published that two themes may become

evident when defining competency frameworks: the description of work tasks, referred to as competence, and the description of attributes, referred to as competency [17]. Therefore, these terms will be included. This study utilised Arksey & O'Malley's (2005) methodological framework [25]. A narrative review methodology was applied to focus intentionally, but broadly, on purpose-relevant, theoretically derived research that could inform a competency framework in paramedicine. The relevant articles were classified into two groups: (a) competency assessment tools; and (b) competency frameworks.

EMBASE, EBSCO, Medline, CINAHL, ScienceDirect and PubMed were searched using Boolean operators AND and OR. The search was conducted using the keywords 'paramedic education,' OR 'paramedic higher education,' AND 'paramedic competence,' and 'paramedic competency frameworks' and 'paramedic competency'. The search was further refined by a snowball strategy identifying relevant references within each article from the primary search. The initial search was performed on 16 November 2022, and the final search was conducted on 4th December 2023. This study considered peer-reviewed journal articles published between 1994 and 2023. The year 1994 was the year when two universities first introduced paramedic education in the higher education sector in Australia; therefore, it can reasonably be assumed that research and literature around paramedic higher education in Australia and New Zealand commenced after this specified date. The saturation point was reached when no relevant published literature was identified beyond 2023. Secondly, a review of grey literature was undertaken, specifically paramedicine accreditation bodies and professional bodies reports.

The review process involved five stages. Figure 1 outlines the process, and the steps undertaken to analyse the quantitative data to determine a relationship between the findings of the literature review against the PBA Professional Capabilities. The process commenced with a search of peer-reviewed journal articles in several databases. We then manually searched paramedicine accreditation bodies' standards and professional bodies' reports. We then excluded articles that were not related to the search terms. The inclusion process included filtering articles based on abstract or where the abstract was identified as vague; the introduction was then reviewed. Stage three involved identifying themes relevant to a competency framework. These themes were then grouped into major headings and coded in Microsoft excel. Stage four involved identifying a relationship between the significant groupings and the five domains for the professional capabilities of registered paramedics. Text network analysis as the core framework for text mining and textual data analysis was undertaken identifying the significant groupings against the domains involved a content analysis of the domains and matching words or similar words from the major groups (e.g., communication, communication skills, interpersonal communication). Finally, bubble charts display three data dimensions using a relationship-based visual spread resembling a scatter plot. Entities—represented as spheres—are plotted on the chart's axes according to two variables and sized according to the third variable. The first variable was the findings from the literature review that were put into themes, the second variable was the mapping of these themes to PBA's professional capabilities, and thirdly, the bubble

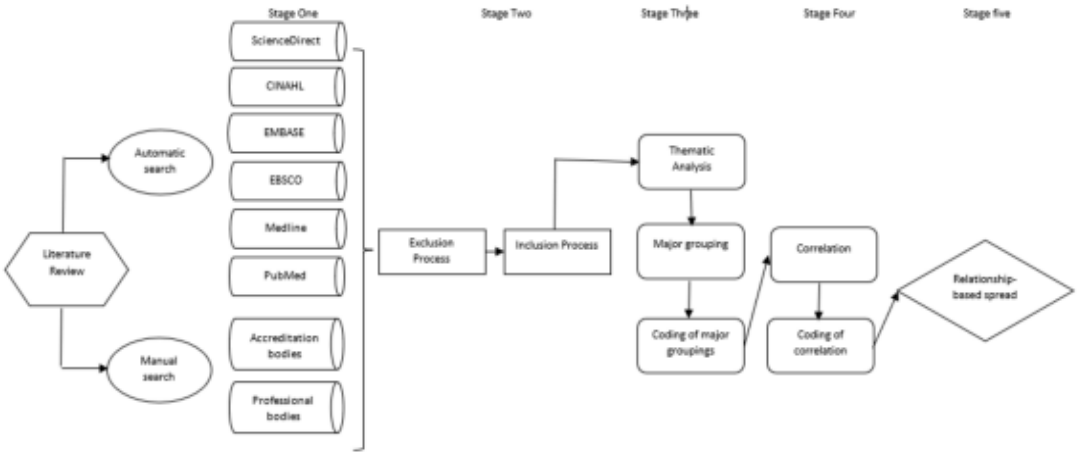

Fig. 1 Methods process

size reflected the relationship between the findings in the literature to the professional capabilities.

Results

The final inclusion process yielded 62 articles; all except one met the final inclusion process. Fifteen articles were grey literature, and one dissertation was also reviewed.. Due to the exploratory nature of this study, the articles were categorised into two groups, (a) competency assessment tools; and (b) competency frameworks.

The thematic analysis approach proposed by Braun and Clarke (2017) involves a systematic process of identifying, analysing, and reporting patterns, or themes, within qualitative data. At its core, thematic analysis serves as a robust foundation for qualitative research [26]. For the thematic analysis, we employed a hybrid approach that incorporated both inductive and deductive elements. Initially, the coding process began with open coding, allowing for the emergence of codes directly from the data in an inductive manner. Subsequently, these codes were iteratively organized into broader categories based on existing literature and theoretical frameworks—a deductive process. This hybrid approach provided a nuanced understanding of the data while ensuring alignment with established concepts in the field.

In the initial stage of our analysis, we identified a substantial dataset comprising 29 competency frameworks and 249 core competencies. These 278 themes were initially treated as descriptive, aligning with the approach of Thomas and Harden (2008), who emphasised the importance of translating descriptive themes into analytical ones for a more nuanced interpretation and hypothesis generation [27].

In our review process, we meticulously organised the data into major groupings, recognising the inherent complexity in grouping concepts and themes [26]. The synthesis unfolded through three distinct stages: firstly, a detailed, free line-by-line coding of the literature review findings; secondly, the organisation of these 'free codes' into related areas to construct 'descriptive' themes; and finally, the development of major groupings that encapsulated and distilled the essence of the 278 themes into 22 significant analytical categories (see Table 1).

We took a quantitative approach to examine how often themes associated with connection appeared in the dataset. Themes were coded based on their connection relevance, and we tallied the frequency of each theme. Assessing the distribution of these themes across the dataset, considering both prevalence and significance, helped determine the degree of association. This method enabled us to quantitatively describe the strength and prominence of connections within the analysed data.

Visual representation of data, such as scatter plots and bubble charts, has previously been recommended for qualitative data display to present and summarise findings ([28]. To provide a better representation of the relationship between the number of times the major analytical groupings were represented in the literature, the depiction of the groups as identified in the domains of the PBA professional capability and the relationship of these groupings to the PBA professional capability, a visual representation of the data is presented [28]. Figure 2 depicts a mapping of the number of documents in the major grouping highlighted in the literature, as shown on the *Y* axis. The number of times the major grouping was identified within one or more domains of the PBA professional capability is shown on the *x*-axis. The size of the bubble represents the relationship between the two. Figure 3 represents mapping of the PBA Capabilities against the findings in the literature.

We identified that intellectual skills were the most prevalent group within the literature, identified within the domains, and posed an excellent association. Intellectual skills were embodied within the literature to demonstrate the knowledge required to practice as a paramedic. They included terms such as knowledge base, educational background, theoretical, and course-based knowledge. Safety was the second grouping identified to be prevalent within two or more domains of professional capabilities; however, it was lower than intellectual skills within the literature. The result is a medium relationship between the literature and the PBA identified within the domains.

Table 1 Major analytical groupings

Accountability	Assessment	Clinician (effective clinical care)	Clinical skills
Clinical decision making (CDM)	Cultural competency	Communication	Educator
Health and Social continuum	Information literacy	Intellectual skills	Leadership
Learning and professional development	Mentoring and clinical supervision	Professionalism	Research
Safety	Scene management	Self-directed practice	Situation awareness
Team approach		Be able to work in different transportation modes.	

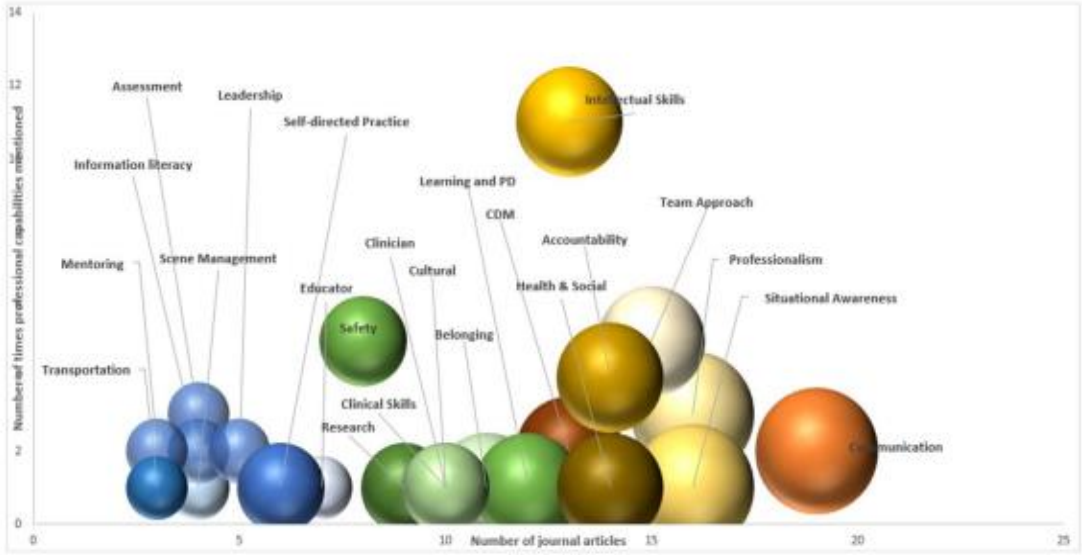

Fig. 2 Relationship between findings from the literature review against the PBA Professional Capabilities

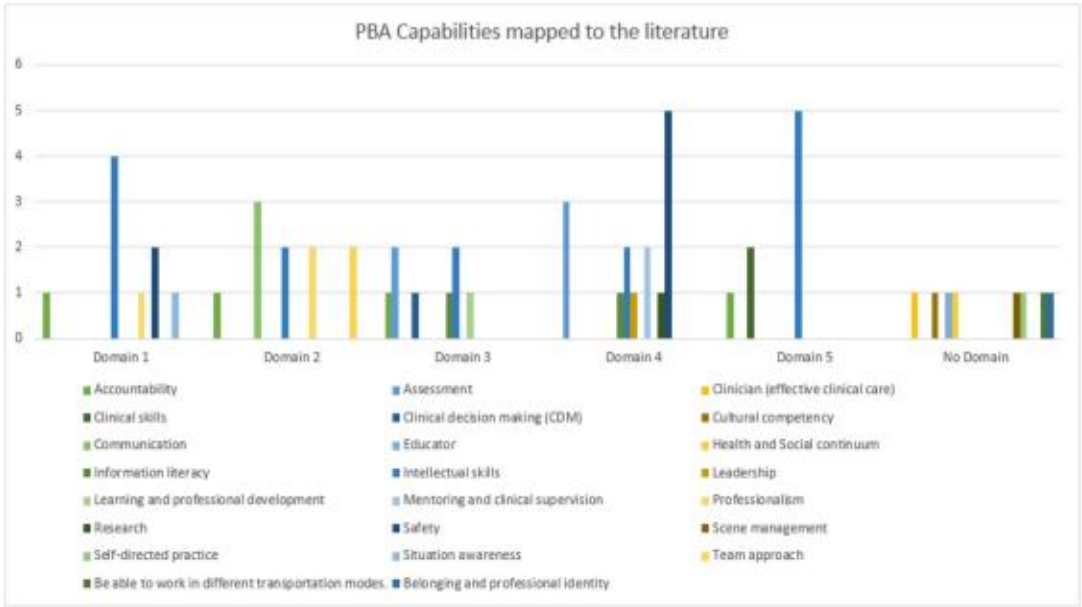

Fig. 3 PBA Professional Capabilities mapped to the findings in the literature

The data analysis highlighted accountability, clinical decision-making, professionalism, communications, team-based approach and situational awareness were the highest-rated groupings within the literature and were identified within one or more domains. The result strongly correlates with the literature findings and the PBA professional capabilities.

On average, providing effective clinical care, clinical skills, cultural competency, learning and professional development and research were identified within

ten articles. However, these groupings were moderately represented within the domains, averaging only two mentions.

Finally, it was revealed within the analysis that the lowest-ranked groupings were assessment, education, Health and Social continuum, information literacy, leadership, mentoring, scene management and self-directed practice. These groupings were mentioned within five or fewer articles and up to four times in the domains. The lowest-ranked groupings were Health and Social continuum and self-directed practice, represented in five articles but should be mentioned within the PBA professional capabilities. These factors have previously been identified as dimensions of professional competence and have been further categorised into cognitive, technical, integrative, context, relationship, affective/moral and habits of mind [12].

Discussion

The paper aimed to systematically examine existing literature on paramedic evolving scope of practice, aligning these insights with the PBA's professional capabilities. The objective was to assess the evidence-based validity of the professional capabilities and identify potential gaps in the current framework.. The results of this narrative review of the literature and mapping study indicate various metrics of what the literature perceives as (a) competency assessment tools; and (b) competency frameworks against the national accreditation schemes' professional capability.

The findings from our literature review and mapping study shed light on various metrics related to competency assessment tools and competency frameworks in comparison to national accreditation schemes' professional capabilities. Accreditation plays a crucial role in ensuring the quality of educational programs. However, the need for more evidence on the assurance of quality achieved through accreditation, as highlighted by Phillips and Kinser (2018),raises important considerations [29]. There needs to be more evidence as to whether an assurance of quality is achieved through accreditation [30].

A framework has previously been defined as the foundational structure supported by facts, concepts, theories, and propositions [31, 32]. It is a term recognisable in the educational sector as necessary due to the independent review of learning activities [32]. A framework develops clear, high-quality standards , with findings from one Delphi study identified that accreditation is crucial for quality improvement [33]. More recently, a report by the World Health Organization described accreditation frameworks as quality interventions that prepare healthcare institutions before and during the accreditation process [33]. These definitions have a common theme: a framework for accreditation is a foundation for quality improvement.

Expanding on the definitions of accreditation and frameworks, our study identified that an accreditation framework encompasses various elements, including intellectual skills, safety, accountability, clinical decision-making, professionalism, communication, team-based approach, and situational awareness. These elements form the basis for being an effective clinician, applying clinical skills, and engaging in ongoing professional development.

Transitioning to our specific findings, the data were categorised into major groupings through a rigorous three-stage synthesis process. Intellectual skills emerged as the most prevalent group, demonstrating a strong relationship with the knowledge required for paramedic practice. Safety, while prevalent, showed a medium relationship with the PBA professional capabilities.

Further analysis highlighted that accountability, clinical decision-making, professionalism, communication, team-based approach, and situational awareness were the highest-rated groupings in the literature, aligning strongly with both the literature findings and the PBA professional capabilities.

On the other hand, groupings such as effective clinical care, clinical skills, cultural competency, learning, and professional development were moderately represented within the domains. Finally, the analysis revealed that the lowest-ranked groupings, including assessment, education, Health and Social continuum, information literacy, leadership, mentoring, scene management, and self-directed practice, were mentioned in fewer articles and fewer times within the domains. Notably, Health and Social continuum and self-directed practice, though represented in five articles, should be emphasised within the PBA professional capabilities, as they contribute to dimensions of professional competence.

Intellectual skills

The discussion on cognitive and technical competence is crucial in the context of paramedicine, as it forms the backbone of effective paramedic care. The emphasis on evidence-based paramedical care underscores the need for a strong foundation in intellectual skills. This includes a comprehensive knowledge base, educational background, theoretical understanding, and course-based knowledge—essential components that contribute to the competency framework for paramedics [23].

As the field of paramedic clinical care evolves, it becomes evident from the literature that staying abreast of changes in medicine and pre-hospital care is paramount [33–36]. The shift towards higher education in paramedic training is supported by the literature,

emphasising the interrelationship between knowledge and practice in preparing students to be job-ready [37]. The acknowledgement that higher-order critical thinking and problem-solving skills, backed by evidence-based practice, are best cultivated through degreed paramedics, aligns with the changing landscape of paramedic education [38].

The study's findings shed light on the prevalence of intellectual skills as a cornerstone of paramedic competence, with a medium relationship to the identified Professional Capability Domains. Safety, while significant, ranks lower than intellectual skills, suggesting a nuanced interplay between theoretical knowledge and practical application.

The discussion on cognitive and technical competence in paramedicine not only underscores the importance of intellectual skills but also emphasises the need for a holistic approach that integrates various dimensions of professional competence. The evolving nature of paramedic clinical care necessitates a dynamic and adaptive education system that equips paramedics with the diverse skills required for optimal patient care.

Accountability, clinical decision-making, professionalism, communication, team-based approach, and situational awareness

The scope of practice and educational requirements for paramedics have transformed significantly over the past four decades, with the COVID-19 pandemic further emphasising the shifting role of paramedicine within the healthcare continuum [39]. Paramedics are now presented with opportunities beyond emergency responsiveness, expanding their roles into chronic and specialist services in primary care, preventive measures, and public health. The increased scope of practice requires paramedics to make complex, cost-effective clinical judgments about patient management and transport to hospitals, reflecting the need for a broader skill set and knowledge base [10].

The findings highlight the critical importance of relationships in paramedicine, emphasising the positive impact on patient outcomes when paramedics build trust, respect, empathy, and effective communication with patients, colleagues, and interdisciplinary teams [40, 41]. Communication skills, grounded in general communication strategies and psychological foundations, are deemed crucial for enhancing paramedic competency [42].

The affective/moral dimension addresses the preparedness of paramedic students to practice, emphasising the role of communication and professionalism skills in ensuring road readiness and minimising deficits for employers [43]. Collaboration between higher education institutions and employers is identified as vital for balancing work requirements and learner experience [44, 45]. The habits of mind in paramedicine, encompassing self-reflection, self-monitoring, and awareness of one's mental, emotional, and physical abilities, are crucial for professional development [46]. However, the study notes a lack of attention to these aspects in both practice and education.

Despite the identification of many competency assessment tools and frameworks, the study reveals a gap in correlating Health and Social continuum and self-directed practice, cornerstone competencies for primary healthcare [46]. Paramedics, as essential resources in health prevention, are positioned beyond emergency care, integrated with health, aged care, and social services [12, 47].

The association between the study's findings and the Professional Capability Domains (accountability, clinical decision-making, professionalism, communications, team-based approach, and situational awareness) supports the literature's emphasis on these areas. However, certain crucial aspects, including providing effective clinical care, clinical skills, cultural competency, learning, professional development, and research, are moderately represented within the domains, signalling a need for further attention and integration into paramedic education.

Clinical care, clinical skills, cultural competency, learning, and professional development

The results of the study highlight a noteworthy discrepancy in the representation of certain crucial areas within the paramedicine profession. Specifically, the dimensions of providing effective clinical care, clinical skills, cultural competency, learning and professional development, and research emerged as focal points in the literature, with an average of ten mentions across various sources. However, the moderation of their representation within the identified domains, averaging only two mentions, brings forth important considerations for the future development and refinement of paramedic education and practice.

The prominence of providing effective clinical care and clinical skills in the literature underscores their foundational significance in paramedicine. These aspects form the bedrock of paramedic competency, directly impacting patient outcomes and the overall quality of pre-hospital care. However, the moderate representation within the domains suggests a potential gap in the integration of these critical components into the recognised Professional Capability Domains.

Cultural competency, identified as a key dimension in the literature, reflects the growing recognition of the diverse communities paramedics serve. Understanding and respecting cultural nuances are vital for delivering

patient-centred care. The moderate representation within the domains calls attention to the need for a more robust integration of cultural competency within the recognized professional capabilities, ensuring that paramedics are equipped to navigate the diverse cultural landscape they encounter in their practice.

Learning and professional development emerge as pivotal dimensions, acknowledging the dynamic nature of healthcare and the continuous evolution of paramedic roles. The literature emphasizes the importance of ongoing education to keep pace with the changing demands of the profession. The moderate representation within the domains suggests a potential gap in acknowledging and structurally embedding continuous learning and professional development as integral components of paramedic competency.

Research, another dimension highlighted in the literature, underscores the importance of evidence-based practice in paramedicine. The ability to critically evaluate and apply current research findings is crucial for ensuring the delivery of optimal patient care. The moderate representation within the domains signals an opportunity to strengthen the emphasis on research skills as an inherent part of paramedic competency.

Addressing these discrepancies requires a thoughtful and comprehensive approach to curriculum development, accreditation frameworks, and ongoing professional training. Integrating these dimensions more prominently within the recognized domains ensures that paramedics receive a well-rounded education that aligns with the diverse and dynamic demands of their profession. It is essential for accrediting bodies, educators, and practitioners to collaborate in refining the competency framework to encompass these critical dimensions, thereby enhancing the overall competence and preparedness of paramedics in the ever-evolving healthcare landscape.

The literature underscores the importance of establishing a conceptual framework as the foundation for paramedicine education, shaping educational practices related to a paramedic's modus operandi (ontology), declarative knowledge (epistemology), clinical judgment (ethics), and procedural knowledge (praxis) [38, 48]. Various papers have highlighted the need for more literature in this area. The absence of frameworks in paramedicine education and accreditation necessitates the creation of a comprehensive framework specifically designed to support paramedic clinical judgment and decision-making skills [49, 50].

One such framework, the complex adaptive system, emerges as a viable option to guide paramedicine's role in the primary healthcare sector [51]. Positioned within the paramedic's roles and responsibilities, this framework signifies a diverse and dynamic working environment that demands rapid adaptation and ongoing quality enhancement, all while being interconnected with other healthcare services [39]. Recommending the use of this framework as the domains for professional capabilities by accreditation bodies could provide a structured and cohesive approach to paramedic education and accreditation, ensuring alignment with the complex and evolving nature of the paramedic profession.

Conclusion

In conclusion, our examination of the existing literature on the evolving scope of practice in paramedicine serves as a crucial foundation for aligning insights with the PBA's professional capabilities. The primary objective was to rigorously assess the evidence-based validity of these capabilities and concurrently identify potential gaps within the current framework.

Our approach, grounded in a comprehensive literature narrative review and guided by Arksey & O'Malley's methodological framework, aimed at providing a nuanced understanding of the evolving landscape. This was further complemented by a robust thematic analysis, employing both inductive and deductive elements, to uncover 278 themes distilled into 22 analytical categories.

The visual representation of data through tables and bubble charts facilitated a deeper comprehension of the relationships between major analytical groupings and the PBA professional capabilities. This methodological transparency not only enhances the credibility of our conclusions but also enables readers to identify the gaps in the professional capabilities against the evolving scope of practice of paramedicine.

Our findings underscored the significance of key analytical groupings, highlighting areas of strength such as accountability, clinical decision-making, professionalism, communication, team-based approach, and situational awareness. Conversely, lower-ranked groupings identified potential areas for attention and further exploration.

In essence, this systematic exploration has not only contributed to the understanding of the evolving scope of practice in paramedicine but has also shed light on the alignment of these insights with the PBA's professional capabilities. The evidence-based approach employed throughout our study not only validates the current framework but also opens avenues for future refinement and development practice.

Supplementary Information

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Additional file 1: Appendix 1.

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Authors' contributions
Associate Professor Anthony Weber wrote the main manuscript text Dr Scott Devenish reviewed the manuscript Associate Professor Luoisa Lam reviewed the manuscript.

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In conclusion, this study highlights the crucial role of accreditation frameworks in improving the quality of paramedicine practice by ensuring that educational curricula align with the competencies required for contemporary paramedic practice. The identification of key competencies—intellectual skills, safety, accountability, clinical decision-making, professionalism, communication, teamwork, and situational awareness—reinforces the need for robust accreditation standards. By mapping these competencies against national accreditation schemes, the study underscores the importance of validating the professional capabilities of paramedic practitioners to ensure they are well-prepared for the dynamic challenges of the profession. This research provides valuable insights into the factors that influence the development and implementation of competency-based curricula, emphasising the need for continuous evaluation and adaptation to maintain high standards in paramedic education.

This chapter flags that the tension between standardisation and innovation is a central dilemma in paramedicine education. Chapter Seven delves further into this issue, exploring how curriculum design must balance regulatory compliance with the need for local relevance and institutional autonomy. It also discusses the practical and political challenges of implementing a unified curriculum in a diverse higher education landscape.

The following chapter introduces Paper Four, titled "Exploring Paramedicine Models of Care: A Novel Macro Analysis Using the RESPIGHT Framework," published in the Australian Journal of Rural Health. This paper was selected because it aligns with the journal's objectives, as it addresses significant issues within the current public health landscape. Through a comprehensive literature review, the paper emphasises the necessity for paramedicine education to adapt to the evolving scope of paramedic practice. This is especially crucial in rural and remote areas, where paramedics often serve as the first point of contact for patients with complex medical conditions.

Chapter 7: Exploring Paramedicine Models of Care: A Novel Macro Analysis Using the RESPIGHT Framework

Weber, A., Devenish, S., Lam, L. (2024). Exploring Paramedicine Models of Care: A novel macro analysis using the RESPIGHT framework. ***Australian Journal of Rural Health.*** **33(1). https://doi.org/10.1111/ajr.13215**

The regulation and accreditation of paramedicine education play a crucial role in ensuring that graduates possess the necessary competencies to navigate the evolving healthcare landscape. Within the framework of Australia's National Registration and Accreditation Scheme (NRAS), paramedicine programs must strike a balance between regulatory compliance and curriculum innovation. The integration of accreditation standards within paramedicine education is central to this thesis, which examines how these regulatory frameworks influence curriculum design and the preparedness of graduates. As part of this broader investigation, the attached paper contributes to this discussion by analysing key aspects of paramedicine education and accreditation, offering insights into how existing structures support or hinder the development of paramedic graduates.

This paper aligns with the overarching aim of this thesis by examining how accreditation processes influence curriculum design in paramedicine education. While accreditation establishes a baseline for competency, it does not prescribe explicit curricular frameworks, leading to significant variation across institutions. This lack of standardisation has implications for graduate readiness, particularly in emerging areas such as primary healthcare, interprofessional collaboration, and leadership within paramedicine. By examining the accreditation landscape through a comparative lens, this paper provides a nuanced perspective on how regulatory frameworks shape educational outcomes.

A key finding of this paper is the tension between accreditation requirements and the dynamic nature of healthcare practice. As paramedicine continues to expand

beyond traditional emergency response roles, education providers must ensure that their curricula remain responsive to these changes. However, rigid accreditation standards may limit curricular flexibility, creating challenges in integrating contemporary healthcare competencies. This paper's insights into these regulatory constraints directly contribute to the thesis' central argument that paramedicine education requires a structured yet adaptable approach to curriculum design.

Moreover, this paper situates Australian paramedicine education within an international context, offering comparative insights that highlight both strengths and areas for improvement. Analysing global best practices underscores the potential benefits of a more cohesive, competency-based curriculum that aligns with accreditation requirements while fostering innovation in paramedicine education.

In summary, this paper serves as a critical component of the thesis by examining the complex interplay between accreditation and curriculum design. It reinforces the broader argument that while accreditation is essential for ensuring professional competency, a more structured and flexible curriculum framework is necessary to prepare paramedic graduates for the realities of contemporary healthcare practice. The findings from this study contribute to the thesis' recommendations for improving paramedicine education, advocating for a more integrated approach that aligns regulatory standards with evolving professional demands.

In summary, this study highlighted the critical need for a more comprehensive and adaptive curriculum in paramedicine education, particularly within the context of Australian universities. By evaluating curricula across 18 institutions, the research has uncovered significant gaps and inconsistencies, particularly in the integration of community and primary care. These findings underscore the necessity for enhanced national accreditation standards that emphasise emergency response and adequately prepare students for the broader spectrum of pre-hospital care. As paramedicine continues to evolve, so must the educational frameworks underpinning it, ensuring that graduates are well-equipped to navigate the dynamic landscape of healthcare, public health, and safety.

Transitioning to the next chapter, we delve into a study that addresses the persistent debate over the relevance of paramedicine education curricula by investigating the evolution of curricula in Australian higher education institutions since 2018. This research aims to identify the essential components of a paramedic curriculum that are necessary to prepare graduates for primary healthcare roles and align with the established domains of practice for registered paramedics. Employing a sequential meta-synthesis method, the study integrates consensus evaluation through a Delphi process, sourcing professional capabilities for paramedicine and data extraction and analysis, utilising the RESPIGHT care model as a framework.

Findings from 68 paramedic academics underscored specific categories crucial for student preparedness, revealing both macro-level alignment and micro-level gaps in curricula. An analysis of curricula from 18 institutions against the RESPIGHT framework highlighted varying degrees of alignment and current trends in paramedicine education. This study emphasises the necessity for ongoing refinement of curricula to meet dynamic educational and practice needs. It offers invaluable guidance for shaping education to produce graduates skilled at meeting the evolving demands of primary healthcare. These insights are crucial for educators, institutions, accreditation bodies, and policymakers in ensuring paramedicine education effectively prepares graduates for the profession's challenges. Further research is urged to refine the mapping process and enhance the effectiveness of paramedicine education.

Chapter 8: Mapping the Evolution of Paramedicine Education: Insights, Trends, and Recommendations for Primary Healthcare Preparedness.

Weber, A., Devenish, S., & Lam, L. (2025). Mapping the Evolution of Paramedicine Education: Insights, Trends, and Recommendations for Primary Healthcare Preparedness. ***International Journal of Paramedicine*****, vol. 10. https://doi.org/10.56068/TYVD4073**

The field of paramedicine is undergoing significant transformation, driven by the evolving demands of healthcare systems and the expanding scope of paramedic practice. This dynamic environment necessitates that paramedicine education remains current and relevant, equipping graduates with the skills and knowledge required for diverse roles, particularly in primary healthcare. The debate over the relevance of existing paramedicine curricula highlights the need to develop educational frameworks that are both comprehensive and adaptable to future challenges.

Since 2018, Australian higher education institutions have been revising their paramedicine curricula to better align with the needs of contemporary practice and the expectations of regulatory bodies. Despite these efforts, questions persist regarding the adequacy of these curricula in preparing graduates for the multifaceted responsibilities of paramedic practice. This study addresses these concerns by investigating the evolution of paramedicine education in Australia, aiming to identify the essential components of a curriculum that effectively prepares graduates for primary healthcare roles and aligns with the established domains of practice for registered paramedics.

Employing a sequential meta-synthesis method, this research integrates consensus evaluation through a Delphi process, sourcing professional capabilities for paramedicine, and data extraction and analysis utilising the RESPIGHT care model as

a framework. This comprehensive approach provides a nuanced understanding of the current state of paramedicine education and identifies specific areas for improvement.

Findings from 68 paramedic academics highlight the critical categories necessary for student preparedness, revealing both macro-level alignment and micro-level gaps in curricula. Analysing curricula from sixteen institutions against the RESPIGHT framework reveals varying degrees of alignment and identifies current trends in paramedicine education. These insights are crucial for educators, institutions, accreditation bodies, and policymakers, providing invaluable guidance for shaping education to produce graduates adept at meeting the evolving demands of primary healthcare.

The objective of this paper is not only to examine the current state of paramedicine education but also to develop a theoretical basis for future practice, accreditation, and curriculum development. By providing a detailed analysis of existing curricula and identifying key areas for refinement, this study aims to contribute to the ongoing discourse on paramedicine education. It provides a roadmap for developing robust, flexible, and future-aligned educational frameworks, ensuring that paramedicine graduates are well-equipped to navigate the complexities of their roles and deliver high-quality care. Further research is urged to refine the mapping process and enhance the effectiveness of paramedicine education, ensuring its alignment with the dynamic landscape of healthcare practice.

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RESEARCH REPORTS

MAPPING THE EVOLUTION OF PARAMEDICINE EDUCATION: INSIGHTS, TRENDS, AND RECOMMENDATIONS FOR PRIMARY HEALTHCARE PREPAREDNESS

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ABSTRACT

Paramedicine education faces challenges in aligning curriculum with evolving practice. Despite updates, our study reveals minimal change since 2018, especially post-transition from the Council of Ambulance Authorities to Paramedicine Board of Australia accreditation. Updates in cultural competency and interprofessional education are noted, but primary healthcare integration remains inadequate, showing a critical gap between education and practice needs. This study assesses the alignment of paramedicine curricula in Australian higher education with evolving practice scopes, focusing on essential components for primary healthcare preparedness. Using a sequential meta-synthesis approach, integrating consensus evaluation via the Delphi method (2018) and RESPIGHT care model analysis (2024), the study examines paramedic curricula from 2018 to 2024. Data from sixteen Australian higher education institutions offering paramedicine programs. Sixty-eight paramedic academics participated in the Delphi study, providing expert insights into curriculum design and alignment. Using the RESPIGHT framework, data extraction and analysis focused on key components crucial for paramedic readiness. The study evaluated alignment with contemporary practice standards and identified curriculum design gaps. Findings indicate varying degrees of alignment across institutions, with limited integration of primary healthcare components. The study highlights the need for ongoing refinement in curriculum design to meet evolving practice demands.

BACKGROUND

The relevance of curriculum in paramedicine education has long been debated, with advocates stressing the need for a contemporary and dynamic curriculum to meet the profession's evolving demands (Weber et al., 2021). Recent literature highlights that graduates must possess functional expertise and the ability to navigate uncertain environments (Ericsson et al., 2022; Reay et al., 2018). O'Meara et al. (2014) previously called for dynamic curricula that adapt to paramedicine's rapid evolution, a concern echoed across various contexts (Spelten et al., 2023).

Newton et al. (2020) reinforce the call for adaptability by emphasizing the accelerated pace of curriculum changes driven by employer demands and technological advancements. This highlights the need for swift adaptation to keep educational programs current. The paramedicine education sector is encouraged to regularly update course materials and validation processes to align with stakeholder expectations and stay abreast of clinical advancements.

Newton et al. (2020) highlight the necessity for swift curriculum adaptations due to employer demands and technological advancements. Historically, paramedic education varied significantly across training programs, prompting a shift to higher education to standardize curricula and competencies (Brooks et al., 2018). As paramedic practice evolves, especially regarding primary health care, curriculum adaptations and national standards become essential to align with contemporary healthcare delivery models (Newton et al., 2020).

Several models have been proposed to outline the professional capabilities necessary for paramedics (Newton et al., 2020; Eaton et al., 2021; Australasian College of Paramedic Practitioners, 2022), yet variability remains in the specific knowledge and skills required for paramedicine students (Shannon et al., 2022). Addressing this gap is crucial for new graduates to effectively contribute to their organizations. Integrating work experience and clinical exposure is vital for developing practical skills.

These insights are significant as they stress the importance of curriculum alignment in preparing healthcare professionals for integrated primary care roles. By addressing educational gaps, healthcare programs can improve responsiveness to healthcare system needs, leading to better patient outcomes.

The primary objective of this research was to examine the development of paramedicine program curricula in Australian higher education institutions since 2018. To achieve this objective, the study addressed the research questions focused on identifying the critical elements of an effective paramedic curriculum that adequately prepares graduates for employment in primary healthcare settings. How well do Australian higher education institutions' paramedicine curricula align with the evolving scopes of practice in paramedicine, particularly in preparing graduates for primary healthcare roles, based on an analysis from 2018 to 2024?

CONCEPT/DESCRIPTION

The research employed a sequential meta-synthesis design, which was chosen for its ability to systematically integrate and interpret findings from multiple studies coherently (Figure 1) (Butler-Henderson et al., 2020). This approach allows for a comprehensive exploration of the research topic by building upon the insights gained from each phase of the synthesis process.

In the context of the described research approach, the sequential meta-synthesis method involves synthesizing findings from multiple studies, each with its interpretations and perspectives. This aligns with the constructivist view that knowledge is constructed through the interaction of researchers with the data and the interpretations they make based on their understandings and perspectives (Mills et al., 2006).

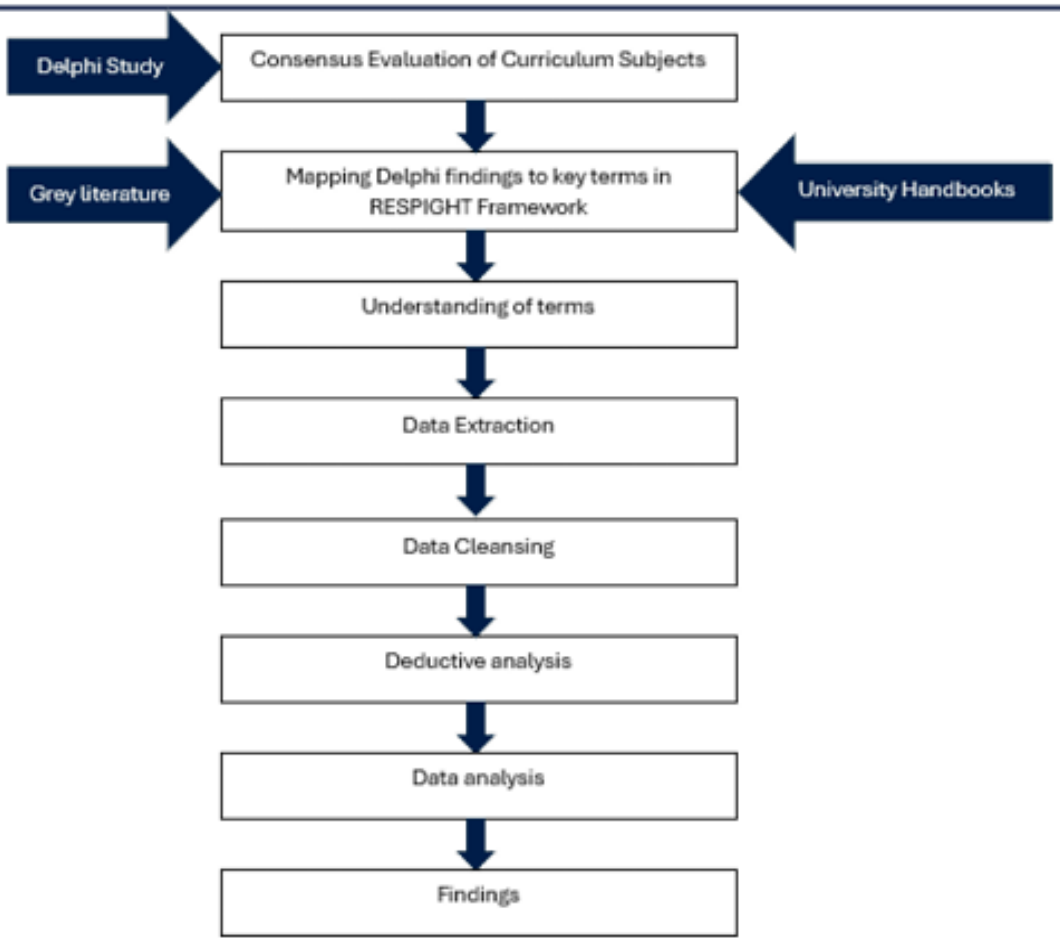

Figure 1. Progress and sequence of methods.

The choices made in the methodological approach were guided by the aim of achieving a comprehensive understanding of the evolution of paramedicine program curricula. Each step in the sequential meta-synthesis process was designed to build upon the previous one, with the findings from each phase informing the development of subsequent stages. This iterative process allowed for a nuanced exploration of the research questions and facilitated the identification of key themes and patterns across studies.

Following the CREDES guideline for rigorous and transparent reporting of Delphi studies, this section outlines the methodology employed in this study (Jünger et al., 2017). In adherence to the CARDA guideline for methodological transparency in document analysis, this section delineates the approach adopted in this study. Despite guidance to improve the rigor of document analysis across various fields, there is a notable absence of clear directives concerning its methodological conduct and reporting standards for peer-reviewed publication.

Step One - Consensus Evaluation of the Curriculum Subjects.

Justification

Delphi studies are reliable for projecting future information scope, making them suitable for examining the paramedic curriculum (Green, 2014). This method, applied without prior research, aligns with constructivist ontology to identify key curriculum elements. Capturing data in 2018 establishes a baseline for tracking curriculum evolution, aiding future comparisons and trend analysis.

Planning and Design

The Delphi process included three data collection rounds (Figure 2). The first round involved paramedic academics identifying crucial units of study through free-text survey responses. In the second round, participants ranked these units using a Likert scale. The third round had participants re-evaluate mean scores from the second round, achieving consensus.

Figure 2. Flow chart Illustrating the stages of Delphi process.

Study Conduct

Maintaining process integrity required a thorough review and piloting of materials for the expert panel. Independent perspectives from public health and paramedicine experts were sought to ensure fairness and effectiveness. The primary author's external position minimized bias, ensuring research integrity and valid consensus.

Reporting

Paramedic academics from 18 universities in Australia and New Zealand were contacted through the Network of Paramedic Academics (NAPA). The expert panel's insights, from clinical and academic environments, informed the study units essential for preparing students as autonomous paramedics. Data collection in 2018 provided a baseline for monitoring curriculum developments and educational priorities, ensuring continuous improvement in paramedic education.

1	Unit of study not important, very unlikely to enhance clinical judgement ability of students to make them road ready
2	Unit of study not very important, unlikely to enhance clinical judgement ability of students to make them road ready
3	Unit of study possibly important may be likely to enhance clinical judgement ability of students to make them road ready
4	Unit of study important, most likely to enhance clinical judgement ability of students to make them road ready
5	Unit of study extremely important, very likely to enhance clinical judgement ability of students to make them road ready

Table 1. Likert scale used within the Delphi study.

Step Two – Mapping Findings from the Delphi Study to Key Terms

Establishing a framework for analyzing paramedicine curriculum data ensures systematic evaluation. In our study, the 2018 Delphi findings were mapped to the RESPIGHT care model in 2024 for a structured analysis. The RESPIGHT model covers various aspects of paramedicine education, such as emergency response, community engagement, primary healthcare, and integration with health services.

Using NVivo software, we organized data according to the RESPIGHT framework categories. This systematic review used open coding to uncover new themes, though no new sub-themes emerged. Axial coding clarified relationships between codes, providing a comprehensive data view. NVivo's comparative features revealed patterns and differences, showing the stability or evolution of curriculum elements over time.

Mapping the 2018 Delphi findings to the RESPIGHT framework allows for a longitudinal curriculum assessment, identifying strengths and weaknesses. This comprehensive mapping guides future curriculum development to better prepare students for the evolving demands of paramedicine practice.

The RESPIGHT framework ensures a balanced evaluation of paramedicine education, highlighting the need for regular updates to keep pace with healthcare changes. This approach promotes relevant and effective paramedicine education.

Step Three – Understanding of Terms

We needed to establish a systematic framework to define the terminologies used in paramedicine university handbooks for our meta-synthesis. In Australian universities, terms like 'degree,' 'program,' and 'course' are often used interchangeably to describe overall educational experiences, while 'subject' or 'unit' refers to specific topics. To effectively compare university degrees, we first standardized institutional definitions. Consequently, we adopted the terms 'course' for overall educational experiences and 'subject' for specific topics within those courses.

Step Four – Data Extraction

The data extraction process for our sequential meta-synthesis involved systematically collecting and comparing findings from the 2018 Delphi study with the categories of the RESPIGHT framework in 2024. This method ensures a comprehensive analysis of the evolution in paramedicine education over time. Figure three outlines each step in the data extraction and analysis process for the sequential meta-synthesis, helping to visualize the systematic approach taken to compare the 2018 Delphi findings with the RESPIGHT framework in 2024.

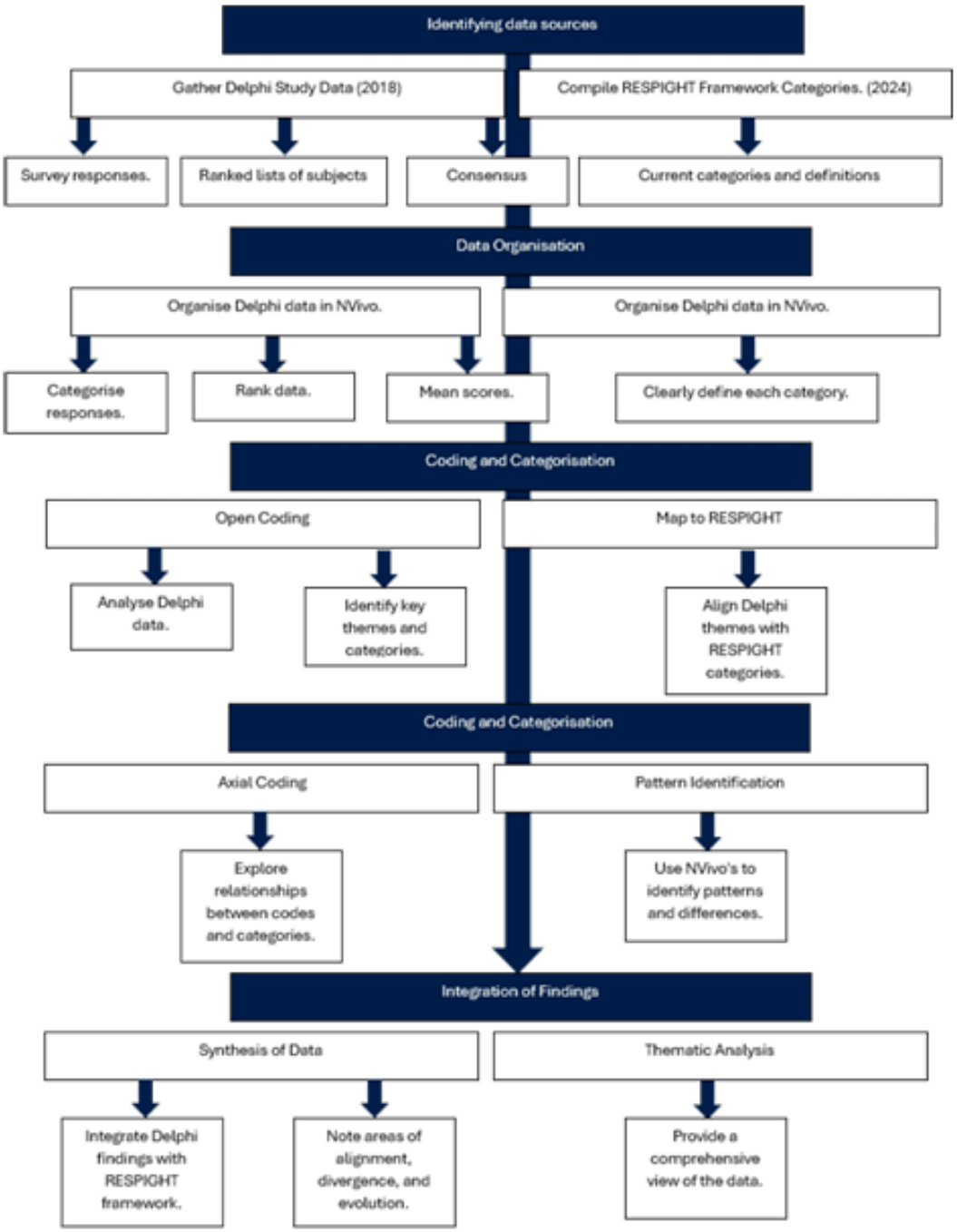

Figure 3. Overall process of data capture.

Step Five – Data Cleaning

Data cleaning is essential to ensure the accuracy and relevance of data before mapping it to the RESPIGHT framework. This process involves reviewing, refining, and validating the dataset to eliminate errors and enhance analysis quality.

The initial step in data cleaning involved thoroughly examining all statements from the 2018 Delphi study, including participant responses, rankings, and comments. The primary objective was to identify and eliminate any duplicate statements. Duplicates often arose when different statements conveyed similar ideas or used identical keywords or phrases. Care was taken to retain each unique statement only once, ensuring the dataset remained concise and focused.

Next, statements containing multiple distinct keywords or themes were addressed. These statements were separated into individual, unique statements as needed. This refinement was crucial for accurately categorizing and mapping each statement to the relevant aspects of the RESPIGHT framework.

After refining the dataset to eliminate duplicates and clarify statements with multiple keywords, each statement's overall relevance was assessed. This detailed analysis confirmed that every piece of data directly contributed to the study's objectives of comparing the findings from the Delphi study to the categories outlined in the RESPIGHT framework. If necessary, statements were re-categorized to ensure alignment with the appropriate RESPIGHT categories, ensuring the dataset accurately represented the diverse aspects of paramedicine education outlined by the framework.

Once satisfied with the dataset's content and relevance, a comprehensive validation process was conducted. This involved confirming the completeness of the dataset, ensuring no critical data was missing, and performing a final quality check to verify the accuracy and integrity of the remaining statements.

Subsequently, the cleaned and validated dataset was organized using NVivo software. This organizational step included assigning each statement to its corresponding RESPIGHT categories, facilitating a seamless transition to the next phase of the analysis. Finally, a final review of the dataset within NVivo was conducted to ensure all statements were correctly categorized and prepared for detailed comparative analysis against the RESPIGHT framework.

This systematic data cleaning and preparation process laid the foundation for extracting meaningful insights and drawing informed conclusions from the meta-synthesis study.

Step Six - Deductive Analysis Approach for Thematic Interpretation and Validation

In the next phase of our study, we used deductive analysis to refine and validate the themes identified from the initial thematic analysis, comparing the 2018 Delphi study with the RESPIGHT framework. Starting with the initial thematic review, we aimed to uncover additional relevant statements that aligned with these themes but had not surfaced initially. These newly identified statements were added to a comprehensive spreadsheet, categorised by theme for data management and analysis.

Validated statements were then confirmed to align with the overarching themes and incorporated into the overall analysis. This integration ensured all relevant insights were considered, providing a comprehensive view of the data. The final dataset, including these additional insights, was used to draw informed conclusions and make recommendations for the paramedicine curriculum in relation to the RESPIGHT framework.

Step Seven – Data Analysis

In our study, the RESPIGHT model of care is a robust framework for analysis, offering a holistic perspective on various facets of paramedicine education. By integrating the findings from the Delphi study, we enhance the depth of our analysis by exploring the evolving scopes of practice within the field. Additionally, we conducted a document analysis of university handbooks across Australia to assess the evolution of curricula, further enriching our understanding of paramedicine education.

This methodological approach ensures a comprehensive and multifaceted examination of the optimal paramedic curriculum subjects. To contribute to the depth of our analysis, we utilised two distinct methods: the Delphi process and analysis of the RESPIGHT model and university handbooks. The Delphi process allows us to capture expert opinions and insights, providing valuable input from practitioners and stakeholders. Integrating the RESPIGHT model and document analysis offers broader contextualization and historical perspectives on the evolution of paramedic curricula, shedding light on trends and developments over time.

The convergence of findings from these diverse methods strengthens the validity and reliability of our research outcomes. By triangulating data from multiple sources and perspectives, we mitigate the risk of bias and enhance the credibility of our conclusions. This rigorous approach underlines the robustness of our study and increases confidence in the generalizability and applicability of our findings to the field of paramedicine education.

Ethics Approval

The Delphi study protocol was approved by the CQUniversity University Human Research Ethics Committee (Reference H17/07-142) in December 2017. No ethics was required for the document analysis of the handbooks as these were available within the public domain.

RESULTS

Consensus Evaluation of the Subjects

During the first round of the Delphi study, 96 paramedic academics affiliated with the NAPA group were initially identified as potential participants. The data collection process commenced with electronic correspondence sent to this group of academics. In the first round of data collection, 48 individuals responded, yielding a response rate of 50% from the targeted sample. Participants were tasked with listing all the curriculum components (subjects, units, topics) they believed were essential in preparing students to become competent, independent, and safe practitioners while remaining adaptable to the evolving practices of paramedicine (Table 2). This round stayed open for 14 days and was accessible through an online survey distributed via Survey Monkey, ensuring participants' anonymity while acknowledging their identity as paramedic academics.

Subjects
Introduction bioscience
Biochemistry
Chemistry
Foundation of Basic Sciences
Pharmacology
Anatomy and Physiology
Pathophysiology
Medical Physiology
Pathophysiology of Issues in Primary Care
Microbiology and infection prevention
Maternal and child health
Pathways of Care in Healthcare
Marginalised Groups in Society
Psychology
Drugs of Abuse
Chronic disease management
Mental health care of patients
Trends in epidemiology
Special and vulnerable populations, including care of patients with disabilities
Health models and the role of paramedicine
Alternate care pathways
Minor Injuries and Minor Illnesses (MIAMI)
Remote and Extended Care
Basic Lab Values Interpretation in Emergency Medicine and Family Medicine: Blood values, imaging, POCUS, ECGs
Clinical Assessment (data interpretation)
ECG interpretation
Advanced electrophysiology and ECG interpretation
Law and Ethics
Understanding Decision Making
Cultural Considerations
The legal premise for paramedic practice
Ethical considerations in practice
Resolving personal, ethical and legal dilemmas
Patient Assessment (assessing the patient, not the machine)
Acute Medical emergency assessment and treatment
Trauma, Environmental emergency and envenomation assessment and treatment
Consolidated Paramedic Practice (capstone)
Medical diagnoses and the complex diagnostic Assessment
Paediatric emergency care assessment
Common Issues of Growth/ Lifespan Issues

Subjects
Acute Medical emergency treatment
Applied pharmacology in paramedic practice
Scene Control
Manual Handling
Clinical Placement/WIL
Self Defence
Practical skills
Basic life support: Includes CPR with AED, basic first aid management, Haemorrhage control and a basic systematic approach
Manual handling
Paediatric emergency management
Treatment Modalities in Emergency Medicine
Human Factors: teamwork
Clinical leadership
Clinical education
Praxis including reflective learning models
Mentoring
Research training/Fundamentals of research
Evidence-based practice
Research project
Introducing the profession
Communications
Foundations of Paramedic Clinical Practice
Medical Terminology, documentation and basic ambulance systems
Clinical communication skills
Professional practice
Paramedic Practitioner Health (Diet, Exercise, Sleep, Injuries)
Stress and Distress: What it is, how it affects us
Occupational Health and Safety

Table 2. Curriculum subjects identified in Stage One of the Delphi study.

In the second round of the Delphi study, participants rated the importance of each curriculum component (subjects, units, topics) using a Likert scale. Importance was defined as the elements of the curriculum that equip graduates with the skills and knowledge needed for their roles in paramedicine. This round had a 71% response rate from 68 paramedic academics the goal was to reach expert consensus on key curriculum elements to enhance student attributes and competence.

In the third round, participants reviewed and could revise their previous scores. They were presented with the scores from the second round, including group mean scores, and could adjust their scores or add new comments over 14 days via SurveyMonkey. Notably, no scores were changed in this round.

The Delphi study provided valuable insights into essential curriculum components for paramedicine education. Categories within the RESPIGHT model achieved high scores and consensus among participants, offering significant guidance for developing comprehensive curricula that meet the evolving demands of the paramedic profession.

Mapping Findings from the Delphi Study to Key Terms

The responses received during the Delphi study were categorized into the recognized categories underpinned by the RESPIGHT framework, which include Response to Emergencies, Engaging with Communities, Situated Practice, Primary Healthcare, Integration with Health, Aged Care, and Social Services, Governance and Leadership, Higher Education and Treatment and Transport (see Table 3).

The Delphi study achieved consensus on 20 subjects distributed across the seven identified categories (Table 4). These findings provide valuable recommendations for inclusion in curriculum development. The subjects identified span a wide range of areas, catering to the diverse needs of paramedic education. Furthermore, 48 more subjects did not reach a consensus.

Data Analysis

To assess the compatibility of curricula with the RESPIGHT framework, we reviewed educational programs from sixteen institutions, focusing on subjects relevant to the RESPIGHT categories. Each subject was evaluated for clear synopses and learning outcomes. Subjects lacking comprehensive synopses or defined learning outcomes were excluded to maintain assessment rigor. Content outside the RESPIGHT framework, such as science-related topics like biochemistry, was generally disregarded unless relevant within the higher education category.

We employed deductive coding techniques, using RESPIGHT search terms and literature-derived codes to identify prevalent themes and trends. This approach allowed us to distil extensive information into meaningful categories for comprehensive analysis.

Our evaluation covered 377 subjects across 19 degrees offered by 16 universities. One university's curriculum lacked accessible online information, potentially limiting our assessment depth for that institution. After coding, 125 subjects were deemed invalid due to non-compliance with the RESPIGHT framework, leaving 252 subjects for further analysis.

Category	Subjects	
Response to Emergencies	Introduction to Bioscience Biochemistry Chemistry Foundation of Basic Sciences Pharmacology Anatomy and Physiology Pathophysiology Medical Physiology Microbiology and Infection Prevention Clinical Assessment (data interpretation) ECG Interpretation Advanced Electrophysiology and ECG Interpretation Patient assessment(assessing the patient, not the machine)	Acute Medical Emergency Assessment and Treatment Trauma, Environmental Emergency, and Envenomation Assessment and Treatment Consolidated Paramedic Practice (Capstone) Paediatric Emergency Care Assessment and Treatment Applied pharmacology in paramedic practice Practical Skills Basic Life Support (CPR with AED, Basic First Aid, Haemorrhage Control) Paediatric Emergency Management Treatment Modalities in Emergency Medicine Clinical leadership
Engaging with Communities	Marginalised Groups in Society Psychology Drugs of Abuse Mental Health Care of Patients	Special and Vulnerable Populations, including care of patients with disabilities Communication
Situated Practice	Maternal and child health Cultural considerations Clinical Placement/WIL	Self Defence Mentoring
Primary Healthcare	Pathophysiology of Issues in Primary Care Pathways of Care in Healthcare Chronic Disease Management Trends in Epidemiology Public Health Health Models and the Role of Paramedicine Alternate Care Pathways	Minor Injuries and Minor Illnesses Remote and Extended Care Basic lab values Medical diagnosis and the complex diagnostic assessment Common issues of growth/lifespan issues
Integration with Health, Aged Care, and Social Services	Law and Ethics Understanding Decision Making Legal Premise for Paramedic Practice Ethical Considerations in Practice	Resolving Personal, Ethical, and Legal Dilemmas Human Factors: Teamwork Professional Practice
Higher Education	Clinical education Praxis, including Reflective Learning Models Research Training/Fundamentals of Research	Evidence-Based Practice Research Project Introducing the profession
Treatment and Transport	Scene Control Manual Handling Foundations of Paramedic Clinical Practice Medical Terminology, Documentation, and Basic Ambulance Systems Clinical Communication Skills	Paramedic Practitioner Health (Diet, Exercise, Sleep, Injuries) Stress and Distress: What it is, how it affects us Occupational Health and Safety Consolidated Paramedic Practice (Capstone)

Table 3. Medication disposal characteristics.

Table 5 presents the percentage breakdown of units aligned with RESPIGHT categories, providing insights into subject content distribution within the curricula and highlighting areas of alignment and divergence from the framework. This detailed examination offers valuable insights into the overall mapping process, the compatibility of educational programs with the RESPIGHT framework, and areas for potential enhancement.

Category	n	Consensus (n) % Likert score 1	Consensus (n) % Likert score 2	Consensus (n) % Likert score 3	Consensus (n) % Likert score 4	Consensus (n) % Likert score 5
Response to Emergencies						
Pharmacology	68				(16) 23.53%	(52) 76.47%
Anatomy and Physiology					(10)14.71%	(58) 85.29%
Pathophysiology				(2) 2.94%	(8) 11.77%	(58) 85.29%
Medical physiology				(2) 2.94%	(24) 35.29%	(42) 61.77%
Clinical assessment				(6) 8.82%	(22) 32.35%	(40) 58.83%
ECG interpretation					(2) 2.94%	(66) 97.06%
Advanced electrophysiology and ECG interpretation				(4) 5.88%	(44) 61.76%	(22) 32.36%
Patient assessment (assessing the patient, not the machine)					(2) 2.94%	(66) 97.06%
Acute medical emergency assessment and treatment					(10) 14.71%	(58) 85.29%
Trauma, environment emergency, envenomation assessment and treatment					(18) 26.47%	(50) 73.53%
Consolidated paramedic practice (capstone)				(10) 14.71%	(16) 23.52%	(42) 61.77%
Paediatric emergency care and assessment			(2) 2.94%	(2) 2.94%	(14) 20.59%	(50) 73.53%
Applied pharmacology in paramedic practice			(2) 2.94%	(2) 2.94%	(14) 20.59%	(50) 73.53%
Practical skills				(2) 2.94%	(20) 29.41%	(46) 67.65%
Basic life support includes CPR, AED, first-aid management, haemorrhage control, and a systematic approach.				(4) 5.88%	(4) 5.88%	(60) 88.24%
Paediatric emergency management				(4) 5.88%	(14) 29.41%	(50) 73.53%
Clinical leadership				(4) 5.88%	(24) 35.29%	(40) 58.83%
Primary Healthcare						
Medical diagnosis and the complex diagnostic assessment	58			(4) 6.90%	(14) 24.12%	(40) 68.98%
Integration with Health, Aged Care, and Social Services						
Human factors: teamwork	68				(34) 50.00%	(34) 50.00%
Treatment and Transport						
Scene control	68		(2) 2.94%	(6) 8.82%	(20) 29.41%	(40) 58.83%

Table 4. Subjects that reached consensus.

Categories	Percentage
Response to emergencies	63.49% (n = 160)
Engaging with communities	3.97% (n = 10)
Situated practice	10.32% (n = 26)
Primary Healthcare	7.14% (n = 18)
Integration with health, aged care and social services	9.13% (n = 23)
Governance and leadership	4.76% (n = 12)
Treatment and transport	1.19% (n = 3)
Invalid	33.15% (n = 125)

Table 5. RESPIGHT factors across undergraduate paramedicine units.

Overall Findings

The comparison between the RESPIGHT framework and the Delphi study highlights significant disparities in their scope and emphasis on paramedic practice and education. The RESPIGHT framework provides a holistic perspective, addressing critical dimensions such as emergency response, primary healthcare, governance, clinical skills, community engagement, and situational awareness. Its emphasis on integrating paramedics into broader healthcare systems and addressing cultural competence reflects the evolving expectations of paramedic roles in diverse contexts.

In contrast, the Delphi study takes a narrower approach, focusing primarily on expert consensus regarding foundational clinical topics such as pharmacology, anatomy, ECG interpretation, and clinical assessment. While these are undeniably important, the study reveals substantial gaps in consensus for critical areas like trauma assessment, clinical leadership, and community-based care. These disparities suggest a fragmented understanding of the broader competencies required for contemporary paramedicine, underscoring a need for further research and dialogue to address these gaps.

Notably, the RESPIGHT framework uniquely prioritizes community engagement and situational practice, while the Delphi study remains centered on emergency response. The absence of consensus in 48 subjects from the Delphi study further highlights areas of uncertainty that require targeted investigation. This underscores the need for future research to focus on underexplored yet essential domains, such as interdisciplinary collaboration, leadership development, and paramedic roles in primary healthcare.

Using the RESPIGHT framework, the Delphi study identified important themes in paramedic education, such as emergency response, community engagement, practice in real-world settings, primary healthcare, integration with health services, governance and leadership, higher education, and treatment and transport. These findings, organised into seven categories and 20 subjects, provide crucial recommendations for developing curricula that address various needs in paramedic education. However, the study also revealed 48 subjects without consensus, suggesting areas needing further exploration.

Analysis of educational programs across 16 institutions revealed varying degrees of alignment with the RESPIGHT framework. While some curricula effectively integrate aspects like primary care and governance, others lack sufficient emphasis on areas such as community engagement and leadership. These discrepancies indicate an urgent need for a more standardized and comprehensive approach to curriculum development, ensuring alignment with industry demands and preparing graduates for multifaceted healthcare roles.

DISCUSSION

This study highlights the evolving landscape of paramedicine education, revealing both progress and persistent challenges. A critical comparison of the RESPIGHT framework and the Delphi study highlights disparities in their scope and priorities, which have significant implications for curriculum development and healthcare preparedness.

Aspect	RESPIGHT Framework	Delphi Study	
Response to Emergencies	63.49% (n = 160)	Pharmacology	76.47%
		Anatomy and Physiology	85.29%
		Pathophysiology	85.29%
		Medical physiology	61.77%
		Clinical assessment	58.83%
		ECG interpretation	97.06%
		Advanced electrophysiology and ECG interpretation	61.76%
		Patient assessment	97.06%
		Acute medical emergency assessment and treatment	85.29%
		Trauma, environmental emergency, envenomation assessment and treatment	73.53%
		Consolidated paramedic practice (capstone)	61.77%
		Paediatric emergency care and assessment	73.53%
		Applied pharmacology in paramedic practice	73.53%
		Practical skills	67.65%
		Basic life support includes CPR, AED, first-aid management, haemorrhage control, and a systematic approach	88.24%
		Paediatric emergency management	73.53%
		Clinical leadership	58.83%
Engaging with Communities	3.97% (n = 10)	- Not addressed	
Situated Practice	10.32% (n = 26)	- Not addressed	
Primary Healthcare	7.14% (n = 18)	- Medical diagnosis and the complex diagnostic assessment: 68.98% agreement	
Integration with Health, Aged Care, and Social Services	9.13% (n = 23)	- Human factors: teamwork: 50.00% agreement	
Governance and Leadership	4.76% (n = 12)	- Not addressed	
Treatment and Transport	1.19% (n = 3)	- Scene control: 58.83% agreement	
Invalid	33.15% (n = 125)	- Not applicable	

Table 6. Correlation of expert consensus and RESPIGHT framework across undergraduate paramedicine units.

The RESPIGHT framework's holistic perspective, emphasizing community engagement, situational practice, and integration into primary healthcare, reflects the expanding role of paramedics beyond emergency response. However, its utility as a guide rather than a formal standard limits its influence on curriculum design, contributing to inconsistencies across institutions. This gap suggests a need for more robust mechanisms to ensure the integration of RESPIGHT principles into educational programs.

Conversely, the Delphi study's narrower focus on foundational clinical topics, while valuable, exposes a lack of consensus in critical areas such as trauma assessment and clinical leadership. These gaps not only highlight missed opportunities for interdisciplinary collaboration but also risk under-preparing graduates for the complexities of modern healthcare environments. The absence of emphasis on community engagement and broader healthcare integration further limits its relevance to the current demands on paramedics.

The findings also reveal significant misalignment between educational programs and industry needs, particularly in primary healthcare preparedness and leadership training. With paramedics increasingly operating in community-based and non-emergency settings, this misalignment risks perpetuating workforce gaps in critical areas. Furthermore, the lack of national consistency in curriculum design exacerbates disparities, undermining efforts to equip graduates with the skills necessary to navigate diverse healthcare challenges.

These results call for urgent action to address these gaps. Strengthening educational standards, embedding community engagement and leadership into curricula, and fostering interdisciplinary collaboration are critical for preparing paramedics for their evolving roles. Without these measures, the field risks lagging behind healthcare demands, ultimately compromising the quality of patient care and equity in service delivery.

LIMITATIONS

The analysis is based on data from a specific subset of institutions and subjects within Australia, potentially limiting the representation of the diverse range of paramedicine programs and curriculum approaches globally. The Delphi study employed a consensus threshold of 90%, which some may consider high. This criterion was centred around subjects deemed high or very high in preparing students for future employment, potentially influencing the outcomes. While the study acknowledges significant changes in paramedicine education since data collection, it primarily focuses on demonstrating that core aspects of paramedic education have not substantially changed, potentially overlooking newer developments.

CONCLUSION

The findings reveal critical disparities in how paramedic education frameworks address the evolving role of paramedics in emergency and primary healthcare. While the RESPIGHT framework offers a comprehensive and forward-looking perspective, the Delphi study's narrower focus on foundational clinical topics exposes gaps that hinder the development of a holistic paramedic education.

A notable shortcoming is the limited integration of primary healthcare principles, cultural competence, and interdisciplinary collaboration in many current curricula. Given the increasing reliance on paramedics in community-based healthcare, it is imperative to prioritize these elements in future curriculum design. To bridge the identified gaps, the following recommendations are proposed:

1. Curriculum Development:
   - Integrate principles of primary healthcare, cultural competence, and interdisciplinary collaboration into existing and future paramedic curricula.
   - Address areas of weak consensus from the Delphi study, such as trauma assessment and clinical leadership, through targeted educational modules.
2. Research Initiatives:
   - Conduct follow-up Delphi studies to refine areas of disagreement and explore emerging topics, such as the role of paramedics in preventative healthcare and chronic disease management.

- Investigate the long-term impact of community engagement and situational awareness training on patient outcomes.

3. Policy and Governance:
   - Develop national guidelines to promote alignment with frameworks like RESPIGHT, ensuring consistency in addressing the broader competencies required of paramedics.
   - Encourage collaboration between accrediting bodies, academic institutions, and healthcare organizations to establish shared priorities.

By combining insights from the RESPIGHT framework and the Delphi study, curriculum developers and policymakers can create a balanced educational approach. This will ensure that paramedics are equipped not only for emergency response but also for the expanding scope of primary healthcare. Such alignment is essential for improving patient outcomes, healthcare equity, and the overall preparedness of paramedics to meet contemporary and future healthcare challenges.

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Since 2018, this study has explored the ongoing debate over the relevance and adequacy of paramedicine education curricula within Australian higher education institutions. By employing a sequential meta-synthesis method and integrating consensus evaluation through a Delphi process, the research has mapped professional capabilities for paramedicine against the RESPIGHT care model framework. Insights gained from 68 paramedic academics have highlighted critical categories for student preparedness, revealing both macro-level alignment and micro-level gaps in the curriculum.

The analysis of curricula from sixteen institutions has identified varying degrees of alignment and current trends in paramedicine education, emphasising the need for ongoing refinement to meet dynamic educational and practice needs. These findings are crucial for educators, institutions, accreditation bodies, and policymakers, providing invaluable guidance for shaping paramedic education that is robust, flexible, and aligned with the evolving demands of primary healthcare.

The overarching objective of this paper is to develop a theoretical basis for future practice, accreditation, and curriculum development in paramedicine. By offering a detailed analysis of existing curricula and identifying key areas for refinement, this study contributes to the ongoing discourse on paramedicine education. It provides a roadmap for developing educational frameworks that ensure paramedicine graduates are well-equipped to navigate the complexities of their roles and deliver high-quality care.

This chapter introduces a subsequent study that centres around a published article highlighting a notable disparity where accrediting body competencies predominantly reflect paramedic professional practice without providing substantial guidance for curriculum development within higher education institutions. The article aims to delve into frameworks that can effectively inform the design of paramedic education curricula. To achieve this, the study initiates a focused discourse analysis of the grey literature, followed by a systematic review to identify approaches that bridge the gap between accrediting body expectations and the development of comprehensive curricula.

The previous research, as discussed through six articles, provides a comprehensive exploration of paramedic practice in Australia, spanning its historical evolution to its present-day status and analysing the educational, regulatory, and

professional infrastructure underpinning it. Furthermore, the articles critically evaluate this framework by juxtaposing it with various systems beyond Australia. Additionally, they delve into the theoretical underpinnings of existing educational programs, scrutinising their efficacy by assessing curriculum applications. Finally, the articles construct a theoretical foundation to inform future practices, accreditation methodologies, and curriculum development strategies within paramedicine.

The gap in the research objectives lies in the absence of a clear delineation regarding the specific focus on the intersection between paramedicine practice, education, regulation, and professional frameworks. While the objectives outline a broad scope encompassing paramedicine's history, evaluation, description, and theoretical development, they lack specificity regarding the precise areas of inquiry within each objective. This lack of specificity could lead to a lack of coherence in the research findings, potentially hindering the identification of actionable recommendations or insights in paramedicine. Therefore, a more focused approach that clearly defines the gaps or challenges within each aspect of the research objectives would enhance the overall effectiveness of the study.

The subsequent article, "Frameworks that Guide Curriculum Development in Australian Higher Education," fills this gap. The article underscores the need for research to establish a consensus on the core knowledge and skills graduate paramedics require. Such consensus is crucial for enabling graduates to proficiently deliver patient care through paramedicine's dynamic and expanding scope. This chapter presents the insights gained from the study, shedding light on the challenges and opportunities for shaping the future of paramedic education.

Chapter 9: Frameworks that guide curriculum development in Australian higher education

Weber, A., Lawson, C., & Williams, B. (2021). Frameworks that guide curriculum development in Australian higher education. Journal of Paramedic Practice, 13(3), 105–112. https://doi.org/10.12968/jpar.2021.13.3.105

This chapter centres around a published article highlighting a notable disparity where accrediting body competencies predominantly reflect paramedic professional practice without providing substantial guidance for curriculum development within higher education institutions.

The article aims to delve into frameworks that can effectively inform the design of paramedic education curricula. To achieve this, the study initiates a focused discourse analysis of the grey literature, followed by a systematic review to identify approaches that bridge the gap between accrediting body expectations and the development of comprehensive curricula.

The research objectives discussed through the previous six articles encompass a comprehensive exploration of paramedic practice in Australia, spanning its historical evolution to its present-day status and analysing the educational, regulatory, and professional infrastructure underpinning it. Furthermore, the articles aimed to critically evaluate this framework by juxtaposing it with various systems beyond Australia. Additionally, it sought to delve into the theoretical underpinnings of existing educational programs, scrutinising their efficacy by assessing curriculum applications. Finally, the articles endeavoured to construct a theoretical foundation to inform future practices, accreditation methodologies, and curriculum development strategies within paramedicine.

The gap in the research objectives lies in the absence of a clear delineation regarding the specific focus on the intersection between paramedicine practice, education, regulation, and professional frameworks. While the objectives outline a

broad scope encompassing paramedicine's history, evaluation, description, and theoretical development, they lack specificity regarding the precise areas of inquiry within each objective. This lack of specificity could lead to a lack of coherence in the research findings, potentially hindering the identification of actionable recommendations or insights in paramedicine. Therefore, a more focused approach that clearly defines the gaps or challenges within each aspect of the research objectives would enhance the overall effectiveness of the study. The gap in the contextual framework is evident in the predominant focus of accrediting body competencies on reflecting paramedic professional practice without offering substantial guidance for curriculum development within higher education institutions. This gap is being addressed by Article Six – Frameworks that guide curriculum development in Australian higher education.

The article discusses the need for research to establish a consensus on the core knowledge and skills that graduate paramedics require. Such consensus is crucial for enabling graduates to proficiently deliver patient care through paramedicine's dynamic and expanding scope. This chapter presents the insights gained from the study, shedding light on the challenges and opportunities for shaping the future of paramedic education.

In conclusion, this study addresses a critical gap in the paramedicine education landscape, highlighting the disparity between the competencies of accrediting bodies and the guidance provided for curriculum development within higher education institutions. By employing a focused discourse analysis of the grey literature and a systematic review, this research identifies frameworks that can bridge this gap and better inform the design of paramedic education curricula. The findings indicate that only a tiny fraction of institutions currently utilise such frameworks, underscoring the need for a more unified approach.

Two key theories have been identified as particularly relevant in supporting the development of curricula that align with the expanded scope of paramedic practice significantly as it shifts towards a primary-focused healthcare model. This shift necessitates a curriculum that equips graduates with the essential core knowledge and skills required to deliver proficient patient care within the dynamic and evolving field of paramedicine.

This chapter provides critical insights into the challenges and opportunities in shaping paramedic education for the future. Further research is needed to establish a consensus on the essential competencies for graduate paramedics, as this will facilitate the development of more comprehensive and effective educational frameworks. Such efforts are crucial for ensuring that paramedic education programs remain relevant and responsive to the changing demands of healthcare.

Building on these findings, the next chapter synthesises key themes emerging across the program of research, drawing together the implications for curriculum development, professional capability, and educational policy. Chapter 10 presents a holistic discussion that integrates international perspectives, accreditation frameworks, and models of care to inform the future direction of paramedicine education.

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Chapter 10: Discussion

10.1 INTRODUCTION

This chapter synthesises key findings from multiple published studies on paramedicine education, accreditation frameworks, and evolving models of care. It examined these findings in the broader context of curriculum development, professional competency, and educational reform, drawing upon comparative international perspectives. The study highlights critical themes, including governance, community engagement, primary healthcare, and the role of accreditation in maintaining curriculum relevance. By doing so, this research contributes to ongoing discussions on how paramedicine education can be refined to meet the dynamic and multidisciplinary demands of modern healthcare systems.

Over the past decade, paramedicine in Australia has undergone significant transformation, evolving from an emergency-response profession to a broader healthcare role that includes primary healthcare, community-based care, and interprofessional collaboration. This shift reflects the growing complexity of modern healthcare systems and the expanding responsibilities of paramedics. However, this evolution also presents a critical challenge: ensuring that paramedic education programs adequately equip graduates for contemporary practice.

The formal registration of paramedics under the Australian Health Practitioner Regulation Agency (Ahpra) in 2018 and the establishment of the 2021 national accreditation standards marked a pivotal shift in paramedic education. While accreditation frameworks define essential professional capabilities, they provide limited prescriptive guidance on curriculum content, resulting in inconsistencies across university programs. These variations raise concerns about whether current educational models sufficiently prepare graduates for evolving paramedic roles, particularly in primary healthcare, governance, leadership, and interprofessional practice.

This chapter critically examined the relationship between accreditation frameworks and paramedicine curricula in Australia, assessing their effectiveness in fostering graduate readiness. To do so, it revisited the research question:

How does the Australian Paramedicine National Registration and Accreditation Scheme prepare paramedic graduates for the evolving scope of paramedic practice?

To address this question, the chapter is structured as follows:

10.2 Summary of Key Findings – A synthesis of the study's significant findings, highlighting areas of alignment and misalignment between paramedic education and accreditation standards.

10.3 Gaps in Paramedic Education & Accreditation – An exploration of inconsistencies in curriculum content and competency requirements, particularly in emerging areas such as primary healthcare and leadership.

10.4 The Role of Accreditation in Curriculum Development – A Discussion on How Paramedicine Has Transformed from a Transport-Based Service to a Regulated Healthcare Profession, Requiring Dynamic Accreditation Frameworks.

10.5 Educational Models and Curriculum Development – An analysis of accreditation's role in shaping curricula, the challenges of implementing national standards, and the variability across institutions.

10.6 Addressing Curriculum Gaps: The RESPIGHT Framework – An Application of the RESPIGHT Model to Assess Curriculum Alignment and Propose Improvements.

10.7 Recommendations and Future Directions – A presentation of strategies for curriculum reform, accreditation enhancement, and further research to ensure paramedicine education remains responsive to evolving healthcare needs.

One central finding of this thesis is the need for a more adaptable paramedicine curriculum that reflects contemporary healthcare models. While Australian programs show strong alignment in emergency and acute care, significant gaps remain in areas such as primary healthcare, governance, and community-based care. This aligns with prior research (O'Meara et al., 2016; Eaton et al., 2021) that emphasises the growing role of paramedics in non-emergency settings. The RESPIGHT model used in this study revealed variability in how universities address these emerging domains.

A key contribution of this research is its critical examination of the relationship between accreditation standards and curriculum design. While accreditation ensures baseline quality and professional capability, it does not explicitly guide curriculum

content or ensure alignment with evolving industry needs. The comparative analysis of international frameworks showed that some regulatory bodies provide more prescriptive guidance, leading to better integration of competencies such as primary healthcare. In contrast, Australian accreditation focuses on broad professional attributes, resulting in inconsistent curriculum development across universities.

This research reinforces long-standing calls (Grantham, 2004; O'Brien et al., 2014) for closer collaboration between education providers, regulators, employers, and industry stakeholders. Effective curriculum reform requires a shared understanding of future workforce demands, technological shifts, and changing models of care.

The findings also challenge the traditional binary between vocational and academic models. Rather than advocating for a strict transition from a competency-based to a knowledge-based framework, this study supports a hybrid approach—one that retains the strengths of vocational clarity while embedding higher-order critical thinking, adaptability, and interdisciplinary practice. However, the current system lacks a clear structure to support such integration.

The role of primary healthcare within paramedicine education remains underdeveloped. As healthcare systems pivot towards preventive and community-based models, paramedic education must prepare graduates for broader roles. Yet, RESPIGHT model analysis shows inconsistent incorporation of primary healthcare, community engagement, and interprofessional learning. This reflects concerns raised by Smith (2017) and Edwards (2011) regarding the limited scope of current curricula.

In response, this study recommends the development of a standardised yet flexible curriculum framework that draws on accreditation standards, workforce needs, and global best practice. Priority areas include:

Strengthening primary healthcare and community care components to reflect current healthcare delivery models.

Enhancing governance and leadership training to support the expanding professional responsibilities of paramedics.

Improving alignment between accreditation bodies and universities to better guide curriculum content and competency mapping.

Drawing on international examples to inform curriculum innovation.

Overall, this research contributes to ongoing discussions about the future of paramedicine education. It underscores the need for curricular structures that are not only aligned with accreditation but are also responsive to the rapidly evolving healthcare landscape. As the paramedic profession continues to grow in scope and complexity, so too must the educational models that support it..

10.2 SUMMARY OF KEY FINDINGS

The collective findings from the five published studies in this thesis highlight a persistent mismatch between current paramedicine curricula and the evolving demands of healthcare. While emergency response remains a central pillar of paramedic education, significant gaps exist in primary healthcare. This gap highlights the need for ongoing refinement of paramedic education to align with the broader healthcare landscape.

The findings highlighted critical challenges and opportunities within paramedic education, accreditation, and competency development. The key findings are:

Gaps in Paramedic Education & Accreditation

The findings identified inconsistencies within national accreditation frameworks, which, while defining essential capabilities, provide limited guidance on curriculum content. As a result, universities implement accreditation requirements differently, leading to variability in how programs prepare graduates for contemporary paramedic practice. The mismatch between accreditation standards and evolving paramedic roles, particularly in primary healthcare and advanced practice, underscores the need for a more structured and standardised approach.

Accreditation frameworks must evolve to better align with regulatory requirements and the real-world demands of healthcare, ensuring that competency-based training encompasses clinical decision-making, professional judgment, and adaptability to equip graduates for modern paramedic roles. While paramedic programs remain strongly focused on emergency response training, significant gaps persist in primary healthcare, governance, and interprofessional collaboration. As paramedicine shifts toward community-based care, there is a growing need to integrate

chronic disease management, public health initiatives, and leadership development into curricula to prepare graduates for the expanding responsibilities in healthcare.

Role of Accreditation in Curriculum Development

Paramedic education is needed to ensure graduates develop the necessary competencies to navigate the expanding scope of paramedic roles. The profession increasingly required paramedics to demonstrate technological literacy, interprofessional teamwork, and community health engagement to meet the demands of evolving healthcare environments. The RESPIGHT framework provided a structured approach to addressing curriculum inconsistencies, ensuring educational programs aligned with workforce needs and accreditation standards. By incorporating emerging healthcare competencies, universities improved graduate preparedness for non-traditional paramedic roles.

Educational Models & Curriculum Design in Paramedicine

Strengthening the theoretical foundations of paramedicine education is essential for bridging the gap between training and practice. By aligning curriculum design with regulatory frameworks, educational institutions ensured that graduates were equipped to operate in diverse healthcare settings. Paramedicine education needs to transition from a competency-based training model to a more comprehensive pedagogical approach that integrates experiential learning, simulation-based training, and problem-solving methodologies to enhance clinical decision-making and adaptability in evolving healthcare environments.

Addressing Curriculum Gaps: The RESPIGHT Framework

Paramedic education must reflect modern models of care that integrate emergency response with preventative and community-based healthcare. The RESPIGHT framework provides a structured approach to mapping curriculum elements to essential professional competencies. A structured theoretical framework can help guide curriculum reforms to ensure educational consistency across universities while allowing for flexibility in program enhancements in response to evolving paramedic roles. The Dreyfus Model (Dreyfus, 2004) provides a tiered competency structure that supports skill development, clinical reasoning, and professional growth in paramedicine. Integrating this model with the RESPIGHT

framework can enhance curriculum alignment with accreditation standards and professional expectations.

The findings align with existing literature, emphasising the need for paramedic education to evolve in response to healthcare demands. O'Meara et al. (2015) and Eaton et al. (2021) emphasise the integration of primary healthcare and chronic disease management into paramedic training. Similarly, Grantham (2004) and O'Brien et al. (2014) emphasise the benefits of transitioning from vocational to higher education, which enhances professional capabilities. However, Edwards (2011) and Cooper (2005) raise concerns about the preparedness of university graduates, arguing that vocational training may offer better hands-on experience. These conflicting perspectives reinforce the need for a balanced approach to curriculum development.

While accreditation frameworks are intended to guide education in paramedicine, their effectiveness in developing fully prepared graduates for evolving healthcare roles remains questionable. Despite calls for accreditation to incorporate clinical decision-making, teamwork, and adaptability (O'Meara et al., 2015; Eaton et al., 2021), current frameworks continue prioritising broader professional capabilities. This narrow focus limits paramedics' ability to transition into community-based roles, where critical thinking and interprofessional collaboration are essential (Grantham, 2004; O'Brien et al., 2014). Furthermore, excluding competencies such as the Health and Social Continuum and Self-Directed Practice from accreditation standards reflects a reactive rather than proactive approach to curriculum development, as it fails to anticipate the profession's expansion into primary healthcare and the management of chronic diseases. The assumption that accreditation alone ensures workforce readiness is increasingly being challenged as outdated competency models fail to reflect emerging healthcare demands (Smith, 2017; Edwards, 2011). Without a structured mechanism for regular review and revision, accreditation risks reinforcing static, outdated models of paramedic education rather than driving meaningful curriculum reform.

While accreditation frameworks provide a vital foundation for education, the evolving nature of paramedic practice necessitates ongoing adaptation of the curriculum. The increasing emphasis on primary healthcare and community-based roles underscores the need to integrate broader competencies into paramedicine education. However, despite advancements in higher education and national

accreditation, persistent curriculum inconsistencies and accreditation gaps raise concerns about the preparedness of graduates and the alignment of the workforce. These challenges stem from disparities in curriculum design, accreditation oversight, and competency framework implementation and continue to impact the profession's ability to meet contemporary healthcare demands (O'Meara et al., 2014; Ryan & Halliwell, 2012). Addressing these issues requires a structured approach to curriculum refinement, stronger collaboration between educators and accrediting bodies, and ongoing evaluation of how accreditation standards shape paramedic education and professional readiness.

10.3 GAPS IN PARAMEDIC EDUCATION & ACCREDITATION

The findings of this thesis identified critical gaps in paramedic education and accreditation that affect the profession's ability to meet contemporary healthcare demands. These challenges, rooted in curriculum design, accreditation inconsistencies, and misalignment between competency frameworks and workforce needs, have been widely discussed in the literature (O'Meara et al., 2014; Ryan & Halliwell, 2012). The transition of paramedicine to higher education and national accreditation has improved professional standards (Paramedicine Board of Australia, 2023); however, curriculum inconsistencies and gaps in accreditation oversight continue to impact graduate preparedness.

Curriculum Gaps and the Need for Greater Integration

The shift from vocational, skills-based training to a university-based model in Australian paramedicine education, as outlined by Brooks et al. (2018), has not been accompanied by a corresponding expansion of curriculum content to prepare graduates for contemporary healthcare demands adequately. Despite the professionalisation of paramedicine through higher education, university curricula remain heavily skewed toward emergency response, with limited incorporation of primary healthcare, governance, and leadership (O'Brien et al., 2014). Given the increasing integration of paramedics into non-emergency, community-based care settings, this narrow focus reflects a misalignment between education and workforce needs.

The Cormack Report (2024) highlights the consequences of this misalignment, identifying regulatory barriers that hinder paramedics from working within their full scope of practice. It argues that multidisciplinary care, legislative reform, and funding

changes are necessary to integrate paramedics into primary healthcare models, thereby reducing dependence on emergency departments and improving patient outcomes. However, accreditation frameworks continue to define competencies in a way that prioritises acute care over broader healthcare capabilities. In that case, paramedicine education will remain stagnant, thereby reinforcing a professional identity that is increasingly at odds with contemporary healthcare systems.

Existing research further highlights the deficiencies within paramedicine education. Research demonstrates that while paramedics are playing a growing role in preventative care, chronic disease management, and community health, university programs inconsistently embed these competencies, leading to significant variability in graduate preparedness (O'Meara et al., 2017; Eaton et al., 2021). This inconsistency suggests that accreditation does not adequately enforce a standardised approach to curriculum development. Similarly, Paramedics Australasia (2014) found that paramedics are increasingly expected to take on leadership and governance roles within healthcare policy and service development. Nevertheless, their research revealed that formalised training in these areas remains peripheral across most programs. This gap undermines the profession's ability to develop practitioners who can influence healthcare reform and lead system-level improvements. Furthermore, a study examining the role of paramedics in public health, mental health, and aged care found that these domains are underrepresented in paramedic curricula despite an apparent workforce demand for greater paramedic involvement in these areas (Williams et al., 2021). The lack of regulatory enforcement for such competencies reinforces a reactionary, rather than proactive, approach to curriculum reform.

This thesis's findings highlight that paramedic education will continue to lag behind workforce developments unless deliberate changes are made to accreditation standards. The Cormack Report (2024) states that regulatory and educational alignment is necessary to ensure that paramedics are legally and educationally prepared to work in expanded roles. This study's findings support this argument, showing that current accreditation frameworks fail to ensure consistency in curriculum content across institutions, which in turn affects workforce mobility and preparedness. While some universities have tried to incorporate primary healthcare training, others remain narrowly focused on emergency response, resulting in an uneven distribution of workforce readiness (O'Meara et al., 2017). This reinforces the need for curriculum

standardisation, particularly in chronic disease management, preventative care, and interprofessional collaboration competencies.

If accreditation frameworks continue prioritising acute care without mandating explicit requirements for broader healthcare competencies, paramedic graduates will remain constrained in their professional capabilities. As seen in other health professions that have undergone regulatory reform, such as nursing and allied health, clear accreditation standards for expanded scopes of practice have facilitated greater workforce integration and role development (Cormack, 2024). In nursing, model curricula have been developed through collaborations between regulatory bodies, professional associations, and government agencies, ensuring alignment with workforce needs and educational standards. A similar approach in paramedicine—led by the Paramedicine Board of Australia (PBA), in consultation with stakeholders—could ensure sustainable and nationally consistent curriculum reform. Without such coordination, paramedicine risks being left behind as other professions adapt to evolving healthcare needs.. This thesis's findings call for accreditation bodies to take a more directive role in shaping curriculum content, ensuring that paramedicine education reflects the realities of contemporary healthcare and prepares graduates for the full spectrum of paramedic practice.

Inconsistencies in Accreditation Frameworks Across Universities

The national accreditation framework ensures that paramedic programs meet the baseline capability requirements set by the Paramedicine Board of Australia (2023). However, no standardised curriculum exists across universities, leading to significant variability in how institutions interpret accreditation guidelines (Hou et al., 2012; 2004; Smith, 2017). Key issues include:

Lack of Standardised Curriculum Content – Accreditation provides competency benchmarks but does not prescribe specific curriculum content (Council of Ambulance Authorities, 2024), leading to unequal coverage of primary healthcare, leadership, and interdisciplinary collaboration.

Variability in Program Implementation – Some universities integrate primary healthcare and non-emergency care training, while others focus predominantly on emergency response, leading to disparities in graduate preparedness (O'Brien et al., 2014).

Governance and Leadership Training Gaps—Despite accreditation requirements for professionalism and leadership, universities employ varying approaches to integrating these skills into their programs (Smith, 2017).

These discrepancies have a significant impact on workforce readiness, mainly as paramedics assume broader roles within healthcare systems (Eaton et al., 2021). The literature suggests that a more substantial alignment between accreditation standards and real-world paramedic practice is necessary to improve educational consistency (Williams et al., 2021).

Misalignment Between Competency Standards and Contemporary Healthcare Demands

The expanding scope of paramedicine, including primary healthcare, telehealth, and mental health support roles, is not fully reflected in current competency frameworks (O'Meara et al., 2015; Eaton et al., 2021). This misalignment is evident in:

- Emerging Healthcare Roles – Paramedics are increasingly involved in chronic disease management, aged care, and integrated health services (Paramedics Australasia, 2014). However, competency frameworks remain largely focused on acute care, limiting curriculum innovation.
- Critical Decision-Making and Autonomy – The literature emphasises the need for paramedics to develop independent clinical reasoning and self-directed practice (O'Brien et al., 2014). Current training does not adequately prepare graduates for autonomous roles in community settings.
- International Best Practices—Other healthcare professions, such as nursing and medicine, have adapted accreditation models to incorporate leadership training, digital literacy, and interprofessional collaboration (Jackson et al., 2016). Paramedicine lags in these areas, limiting its ability to integrate fully within the healthcare system.
- Addressing these gaps requires collaboration among accreditation bodies, universities, and industry stakeholders to ensure that competency frameworks align with workforce needs and that paramedic education

evolves in response to the changing demands of modern healthcare (O'Meara et al., 2017).

By strengthening accreditation oversight and ensuring greater consistency in curriculum design, paramedic education can better equip graduates with the skills necessary for expanded and emerging roles in healthcare systems.

10.3.1 Evolution of Paramedicine and Regulatory Needs

The literature indicates that paramedicine has undergone a substantial transformation from a transport-based service to a sophisticated clinical profession with an expanding scope of practice (O'Meara et al., 2015). This shift necessitates regulatory frameworks that are dynamic and responsive to industry advancements. Historically, ambulance services focused primarily on patient transport rather than clinical intervention (Moritz, 2018). Early paramedics, often referred to as ambulance drivers, were initially recruited for their mechanical skills and basic first-aid knowledge rather than formal healthcare training (Davis, 2017). The shift toward a more professionalised paramedic workforce began in the late 20th century with the introduction of structured vocational training programs and, eventually, university-based education (Grantham, 2004). The formation of the Council of Ambulance Authorities (CAA) in 1962 and its role in setting national competency standards in 2002 further reinforced the need for consistency in paramedic education (Grantham, 2004).

Despite these advancements, significant challenges remain in aligning paramedic education with contemporary healthcare needs. The literature highlights concerns regarding the dual accreditation of vocational and university pathways, with ongoing debate about the role of vocational diplomas in the profession (Paramedicine Board of Australia, 2023). The introduction of the Paramedicine Board of Australia (PBA) in 2018 as part of the National Registration and Accreditation Scheme represented a critical step toward standardising paramedic qualifications and ensuring public safety (Ahpra, 2016). However, as paramedicine expands beyond emergency response into primary and community healthcare, existing accreditation frameworks may not fully capture the evolving competencies required for modern practice (O'Meara et al., 2016; Porter et al., 2020).

These historical shifts provide essential context for interpreting the study's findings. The variation in curriculum alignment with the RESPIGHT framework reflects the broader challenge of balancing traditional emergency-response training with the emerging emphasis on primary healthcare, governance, and interdisciplinary collaboration. As seen in nursing education, accreditation frameworks must evolve to accommodate expanded roles while maintaining core clinical competencies (Boore & Deeny, 2012). Given the historical reliance on vocational training, a more structured competency-based framework, informed by historical precedent and contemporary healthcare demands, is necessary to guide curriculum development effectively.

The Paramedicine Board of Australia (PBA) and the Paramedic Accreditation Committee set accreditation standards for paramedic education programs, ensuring that graduates meet the competencies required for safe and effective practice (Paramedicine Board of Australia, 2022). However, as paramedicine increasingly integrates primary healthcare roles and advanced clinical interventions, questions arise about whether current regulatory frameworks sufficiently accommodate these changes.

The variability in curriculum alignment across different regulatory frameworks underscores the need for dynamic and responsive governance. As paramedicine continues to evolve into a sophisticated clinical profession with an expanding scope of practice, regulatory bodies must adapt to ensure that accreditation standards remain aligned with the emerging demands of the industry.

10.3.2 Accreditation and Curriculum Development

Accreditation plays a pivotal role in shaping paramedic education by establishing national standards that ensure graduates meet minimum competency requirements for professional practice. The introduction of national accreditation through the Paramedicine Board of Australia (PBA) and regulation under the Australian Health Practitioner Regulation Agency (AHPRA) has significantly contributed to the professionalisation of paramedicine (Paramedicine Board of Australia, 2023). However, variability in how accreditation is implemented across universities, coupled with gaps in oversight, raises concerns about curriculum consistency and workforce preparedness.

How Accreditation Frameworks Shape Paramedic Education

Accreditation frameworks define the fundamental knowledge, skills, and professional attributes that paramedic graduates are expected to possess. The Paramedicine Accreditation Standards, set by the PBA under the National Registration and Accreditation Scheme (NRAS), establish key educational components, including core clinical competencies, professional and ethical standards, and clinical placement requirements. Core clinical competencies ensure that graduates can safely perform pre-hospital assessments and emergency interventions and make critical decisions (Ahpra, 2016). Additionally, accreditation enforces professional and ethical standards integrating paramedicine within a regulated healthcare framework, reinforcing expectations of conduct, continuing professional development, and patient safety (Paramedics Australasia, 2014). The accreditation process also mandates a minimum number of supervised clinical placement hours, ensuring that students gain real-world experience in diverse prehospital care settings.

This accreditation model has led to significant advancements in paramedic education, transitioning the profession from a vocational, competency-based training model to a university-led, knowledge-driven approach (Brooks et al., 2018). The establishment of accreditation has also strengthened paramedicine's role within the broader healthcare system by reinforcing its status as a regulated health profession (O'Meara et al., 2017). While accreditation has elevated the profession's credibility and standardised minimum competency levels, its influence on curriculum design remains largely interpretive, allowing universities to structure programs differently within the confines of accreditation guidelines.

Shortcomings in Existing Accreditation Processes

Despite the role of accreditation in ensuring baseline competency, several shortcomings affect curriculum consistency and graduate preparedness. One of the most significant limitations is the lack of a standardised national curriculum. While accreditation establishes broad competency benchmarks, it does not mandate specific curriculum content (Council of Ambulance Authorities, 2012). As a result, key areas such as primary healthcare, governance, and leadership are inconsistently addressed across institutions, resulting in disparities in graduate competencies (Smith, 2017). This variability is further evident in how universities implement their programs, with some institutions integrating emerging roles in primary and community healthcare

while others focus primarily on emergency response training (O'Brien et al., 2014). The absence of standardisation means that graduates from different programs may have differing levels of preparedness for contemporary paramedic practice, particularly as the scope of paramedicine expands beyond traditional emergency care.

Another limitation of the current accreditation model is the lack of oversight in curriculum evolution. As healthcare systems evolve, paramedics are increasingly required to engage in telehealth, mental health support, and chronic disease management (Eaton et al., 2021). However, accreditation frameworks do not require universities to update curricula regularly to reflect these emerging demands. Consequently, paramedic education risks falling behind advancements in healthcare, leaving graduates underprepared for new responsibilities. Additionally, accreditation predominantly follows a competency-based approach, which ensures that students attain the minimum required skills but does not necessarily encourage advanced clinical reasoning, leadership, or interprofessional collaboration (O'Meara et al., 2016). This focus on baseline competency rather than fostering a more comprehensive skillset may limit graduates' ability to adapt to the changing demands of the healthcare sector.

10.3.3 The Role of Accreditation in Curriculum Development

The PBA and Ahpra are critical in regulating paramedic education and ensuring accreditation aligns with national healthcare standards. The PBA, established under Ahpra, is responsible for setting accreditation standards, approving education providers, and maintaining the national register of paramedics (Ahpra, 2016). Through this role, the PBA ensures that paramedicine programs meet minimum competency requirements, but it does not dictate the precise content of curricula beyond these standards. This allows universities considerable flexibility in designing their courses, contributing to inconsistencies in graduate outcomes.

Ahpra’s role extends beyond accreditation enforcement to include professional regulation and maintaining public trust in paramedicine. Ahpra ensures that accredited programs comply with regulatory requirements and that graduates meet paramedic practice's legal and ethical obligations (Paramedicine Board of Australia, 2023). However, Ahpra does not directly influence curriculum development, meaning that while universities must meet accreditation criteria, they retain significant autonomy in determining how those criteria are addressed. Paramedicine, unlike other health

professions, lacks a formalised national curriculum framework akin to those established by the College of Paramedics in the UK, which provides comprehensive curriculum guidance (Jackson et al., 2015). Australia's absence of a unified curriculum model contributes to the variation in educational outcomes and preparedness for contemporary paramedic practice.

Despite accreditation's essential role in ensuring minimum competency, gaps in standardisation and oversight highlight the need for a more structured approach to paramedic education. Strengthening collaboration between accrediting bodies, universities, and industry stakeholders would help bridge the disconnect between regulatory requirements and real-world workforce needs. A more comprehensive approach could involve developing national curriculum guidelines that ensure greater consistency across programs while maintaining the flexibility to adapt to emerging healthcare challenges.

Accreditation has played a critical role in the professionalisation of paramedicine by establishing national competency standards and ensuring that education providers maintain baseline requirements for graduate competency. However, shortcomings in accreditation processes, including a lack of curriculum standardisation, evolving competency frameworks, and limited regulatory oversight, highlight the need for reform. While the PBA and Ahpra ensure that programs meet minimum professional standards, their limited role in shaping curriculum content has resulted in inconsistencies across institutions, leading to disparities in graduate preparedness. Addressing these challenges requires a national approach to curriculum standardisation, ensuring that paramedic education aligns with the evolving demands of healthcare. By developing a structured national curriculum framework, strengthening accreditation oversight, and fostering collaboration between regulatory bodies and universities, accreditation can transition from ensuring minimum competency to actively driving excellence and innovation in paramedic education.

Accreditation ensures paramedicine curricula align with professional standards and industry expectations (Council of Ambulance Authorities, 2024). However, accreditation standards must be regularly updated to reflect changes in paramedic practice (Smith, 2017). The findings suggest that tertiary institutions require more explicit guidance on integrating emerging healthcare trends into paramedic curricula.

One primary concern is whether current paramedic programs adequately prepare graduates for non-traditional roles, such as primary healthcare, mental health support, and community-based care (O'Meara et al., 2015). While some programs incorporate interdisciplinary training, variability exists in how well these curricula address the competencies required for evolving roles (Johnston & Bilton, 2020). Thus, the need for a collaborative approach, where paramedic services, regulatory authorities, and tertiary institutions co-develop educational frameworks that ensure graduates possess the requisite knowledge and skills to navigate an evolving profession, is highlighted.

Accreditation ensures that paramedicine curricula meet professional standards and industry expectations (Paramedicine Board of Australia, 2023). However, as paramedic practice evolves, accreditation standards must be regularly updated to reflect these changes (Smith, 2017). The study's findings suggest that tertiary institutions require more explicit guidance on integrating emerging healthcare trends into paramedic education.

One primary concern is whether current paramedic programs adequately prepare graduates for non-traditional roles, such as primary healthcare, mental health support, and community-based care (O'Meara et al., 2015). Although some programs incorporate interdisciplinary training, there is variability in how effectively these curricula address the competencies required for these evolving roles (Johnston & Bilton, 2020). To address this, a collaborative approach is necessary, where paramedic services, regulatory authorities, and tertiary institutions work together to co-develop educational frameworks that ensure graduates are equipped with the necessary knowledge and skills for a rapidly evolving profession.

While this discussion chapter presents broader recommendations regarding paramedic education and accreditation, the following recommendations are precisely aligned with the findings of this section:

1. Enhanced Integration of Primary Healthcare Training – Curricula should expand their focus beyond emergency response to include chronic disease management, mental health, and preventive care (Eaton et al., 2020; O'Meara et al., 2016).

2. Greater Emphasis on Community Engagement and Governance – Strengthening these areas will better prepare graduates to work in diverse healthcare

environments and support informed decision-making within the health system (Eaton et al., 2020; O'Meara et al., 2016).

3. Updating Accreditation Frameworks – Accreditation bodies should ensure that competency standards reflect contemporary practice, incorporating topics such as social determinants of health and self-directed learning (World Health Organization, 2019; Smith, 2017).

4. Improved Competency-Based Assessment Models – Existing competency assessment tools should be updated to capture emerging skill sets in paramedicine accurately (Eaton et al., 2020; O'Meara et al., 2016).

5. Fostering Stakeholder Collaboration – Collaboration among universities, accreditation bodies, and industry stakeholders is crucial to ensure that curricula remain relevant and aligned with the needs of the healthcare system.

6. International Benchmarking – Comparing Australian paramedicine curricula with international models can provide valuable insights into best practices for curriculum design and alignment with accreditation standards.

These recommendations contribute to the broader discussion on the future of paramedic education and accreditation, specifically addressing how curricula and accreditation frameworks can better align with the evolving role of paramedics in diverse healthcare settings.

The findings reveal critical gaps in paramedicine curricula, particularly in the areas of primary healthcare, community engagement, and governance. While accreditation ensures a baseline competency, it does not necessarily drive curriculum development in a way that fully aligns with the evolving roles of paramedics. The study emphasises the importance of continuous curriculum refinement, underscoring the need for structured approaches that integrate accreditation standards, industry requirements, and contemporary healthcare challenges.

By addressing these gaps through targeted curriculum enhancements and stakeholder collaboration, paramedicine education can better equip graduates to navigate the complexities of modern healthcare practice. Implementing theoretically grounded frameworks, such as the Dreyfus model and the RESPIGHT framework, can ensure that paramedic education remains responsive to the changing demands of

healthcare. Ultimately, these advancements will improve patient outcomes and further professionalise paramedicine as an essential component of healthcare delivery.

Building on the need for targeted curriculum enhancements, the review process further reveals the multifaceted nature of paramedic competencies. By categorising these competencies into distinct groupings, it becomes evident that a comprehensive approach is required to integrate both technical and non-technical skills, ensuring that paramedicine education aligns with the evolving demands of healthcare practice.

A comparative analysis of paramedicine regulatory frameworks highlighted the role of centralised regulatory bodies, such as the Australian Health Practitioner Regulation Agency (Ahpra) and the Health and Care Professions Council (HCPC), in fostering standardised curricula. In contrast, countries with decentralised models exhibited more significant variability in educational content, leading to inconsistencies in the alignment of professional competencies. The study found that paramedicine curricula do not always fully align with professional capability frameworks, particularly in key areas such as health and social integration and self-directed practice.

10.3.4 Alignment of Regulatory Frameworks with Educational Standards

The development of paramedicine curricula is intrinsically linked to regulatory frameworks and accreditation standards, which establish the minimum competencies required for professional practice. The Paramedicine Board of Australia (PBA), operating under the oversight of the Australian Health Practitioner Regulation Agency (Ahpra), plays a central role in setting and enforcing these standards (Ahpra, 2016). Since the national registration of paramedicine in 2018, all accredited paramedicine programs must align with the Paramedicine Board of Australia's Accreditation Standards for Paramedicine, ensuring that graduates possess the skills, knowledge, and professional attributes necessary for safe and competent practice (Paramedicine Board of Australia, 2022).

A key function of accreditation is to balance core emergency care competencies with the growing demands of primary healthcare, community-based care, and interprofessional collaboration. However, this study's findings highlight inconsistencies in curriculum alignment across institutions, suggesting that while accreditation provides a broad framework, its application may vary significantly. This is particularly evident in the integration of health and social care, governance, and

leadership, which are underrepresented in some curricula despite being essential for contemporary paramedic practice (Porter et al., 2020).

The literature emphasises the importance of periodically reviewing and revising accreditation standards to ensure they reflect emerging healthcare trends and evolving scopes of practice (Smith, 2017; World Health Organization, 2019). While accreditation frameworks serve as a quality assurance mechanism, they must also remain flexible and responsive to changes in the roles of paramedics. Nursing education sets a valuable precedent, as national accreditation schemes have driven curriculum reform, ensuring that graduates are equipped for clinical practice and leadership roles (Boore & Deeny, 2012).

A similar approach is required for paramedicine to bridge gaps between education, accreditation, and workforce readiness. The PBA and Ahpra must establish mechanisms for greater stakeholder engagement, ensuring that universities, industry leaders, and regulatory bodies collaborate to refine competency frameworks. This would facilitate a more structured approach to curriculum development, reducing institution variability and ensuring that graduates are consistently prepared for contemporary practice. Future research should examine international accreditation models to identify best practices and inform a more cohesive accreditation framework for paramedicine education in Australia.

The findings suggest that while centralised regulatory bodies provide consistency, their rigid structures may limit adaptability to emerging healthcare trends. Countries with more flexible accreditation models allow for more significant innovation in curriculum design but may lack standardisation. This reinforces the importance of striking a balance between structured regulatory oversight and curricular flexibility.

The findings align with the literature's emphasis on the role of professional bodies in shaping educational curricula and professional competencies (Flanagan et al., 2024). Recognising expanded and extended paramedic roles, such as community and critical care paramedicine, requires regulatory endorsement to support professional development pathways (Eaton et al., 2021). In countries where regulatory frameworks remain static, there is a risk that paramedic education will lag behind industry needs, potentially limiting the readiness of graduates for contemporary practice.

While professional bodies play a key role in shaping educational curricula, the study highlights a critical gap in regulatory guidance regarding non-traditional competencies. As paramedic practice evolves, the lack of clear regulatory direction in primary healthcare and interprofessional collaboration further contributes to inconsistencies in curriculum development and the preparedness of graduates.

Identified Gaps in Paramedic Education and Accreditation

The findings of this thesis underscore the importance of regulatory authorities collaborating closely with paramedic services, educational institutions, and industry stakeholders to define the evolving scope of practice and update accreditation standards accordingly. Given the increasing integration of primary healthcare roles within paramedicine, future regulatory frameworks must incorporate the following:

1. Expanded Scope of Practice – Recognition and accreditation of paramedic roles in primary and community healthcare, reflecting the profession's evolving responsibilities.

2. Standardised Competency Frameworks – Harmonising accreditation standards across jurisdictions to ensure consistent graduate outcomes while allowing for regional curriculum adaptations.

3. Flexibility in Curriculum Development: This enables universities to incorporate emerging healthcare trends while meeting regulatory requirements.

4. Pathways for Specialisation – Formal recognition of advanced practice areas, such as critical care, mental health, and community paramedicine.

5. Collaboration Between Regulatory Bodies and Educational Institutions – Ensuring continuous dialogue between accreditation authorities and curriculum developers to maintain the relevance of paramedic education.

The comparative analysis of paramedicine regulatory frameworks underscores the need for a more adaptive approach to accreditation and competency development. While centralised models offer consistency, they must evolve to accommodate the growing complexity of paramedic roles. This study highlights the importance of regulatory bodies collaborating actively with educational providers and industry stakeholders to ensure that accreditation standards align with the realities of contemporary paramedic practice. By integrating broader healthcare competencies and

supporting specialisation pathways, regulatory frameworks can better prepare graduates for contemporary healthcare challenges and enhance the professionalisation of paramedicine.

While the need for adaptive regulatory frameworks is clear, the analysis of the RESPIGHT framework highlights the current curriculum's disproportionate emphasis on emergency response. This imbalance underscores the gap between traditional paramedic roles and the broader competencies necessary to address emerging healthcare needs, underscoring the need for curriculum evolution in line with regulatory advancements.

10.4 ROLE OF ACCREDITATION IN CURRICULUM DEVELOPMENT

The Paramedicine Board of Australia (PBA), the Paramedicine Accreditation Committee, and the Australian Health Practitioner Regulation Agency (AHPRA) regulate paramedic education by setting accreditation standards, approving education providers, and ensuring compliance with national healthcare regulations. While they establish minimum competency requirements, they do not dictate specific curriculum content, allowing universities flexibility in course design but contributing to inconsistencies in graduate preparedness. Unlike other health professions, paramedicine lacks a formalised national curriculum framework, leading to variability in educational outcomes. Addressing these gaps requires stronger collaboration between accrediting bodies, universities, and industry stakeholders to align paramedic education with workforce demands. Developing national curriculum guidelines, strengthening accreditation oversight, and promoting standardisation will ensure paramedic education evolves beyond basic competency to support excellence and innovation in the profession.

Accreditation plays a critical role in shaping paramedic education by establishing competency frameworks and regulatory guidelines that ensure graduates are prepared for professional practice. However, gaps in professional capabilities persist, particularly in areas such as community health, self-directed practice, and interdisciplinary collaboration (O'Meara et al., 2016; Porter et al., 2020). While accreditation standards outline minimum competency requirements, they often do not fully reflect the evolving role of paramedics in primary healthcare and the management of chronic diseases. This misalignment between curriculum content and workforce

expectations highlights the need for a more structured approach to curriculum development that is responsive to contemporary healthcare demands.

A significant gap identified in the literature is the lack of explicit recognition of paramedics' role in the broader healthcare system, particularly in community health and primary care (O'Meara et al., 2016). The Health and Social Continuum, which reflects paramedics' expanding role beyond emergency response into preventative and chronic disease management, is acknowledged in research but remains underrepresented in accreditation frameworks (Porter et al., 2020). Additionally, self-directed practice, the ability of paramedics to take initiative in their professional development and clinical decision-making, is widely regarded as essential for lifelong competency (Smith, 2017), yet it is not explicitly embedded in professional capability standards. These omissions suggest that current accreditation processes do not fully support the development of independent, adaptable practitioners, reinforcing the need for structured curriculum reform to ensure graduates are equipped for autonomous decision-making in diverse clinical settings.

Despite the increasing recognition of paramedics' expanded scope of practice, only three of the 20 institutions in Australia and New Zealand (Australian Council of Paramedicine Deans, 2025) offering paramedic education have identified a structured framework to guide curriculum development. This indicates a lack of standardisation in how accreditation standards are translated into educational content, resulting in variability in graduate outcomes (Smith, 2017). The literature further identifies two theoretical models that can support curriculum development in paramedicine, particularly in preparing students for non-emergency, primary-focused healthcare roles (O'Meara et al., 2016). The shift toward community-based and preventive healthcare necessitates that universities integrate theoretical foundations that support the development of competencies in these emerging areas (Smith, 2017).

To address this gap, structured curriculum evaluation methods, such as the Delphi methodology, have been employed to achieve expert consensus on essential subjects for preparing students for contemporary and future paramedic practice. This process, which engaged paramedic academics from Australia and New Zealand, identified core subjects necessary for developing competent, adaptable, and independent clinicians. These findings provide a strong theoretical foundation for

curriculum design and accreditation policies, reinforcing the need for national curriculum guidelines that align with workforce needs.

Ensuring that paramedic education aligns with regulatory requirements and industry expectations is crucial for maintaining the relevance and quality of the curriculum. The literature highlights underrepresented areas such as leadership, digital health literacy, and health system navigation, which are becoming increasingly relevant in contemporary practice (Williams et al., 2021). Integrating these competencies into accreditation frameworks will enhance graduate preparedness for expanded roles in primary healthcare and community-based care. However, this thesis outlines that the absence of a unified accreditation framework in paramedicine has resulted in fragmented curriculum development approaches across universities. This highlights the need for structured, evidence-based mechanisms to support the integration of emerging competencies into paramedic education.

The findings underscore the critical role of accreditation in curriculum development, while also highlighting gaps in competency frameworks that fail to fully address the evolving scope of paramedicine. To ensure curriculum consistency and workforce readiness, paramedic education must incorporate structured accreditation standards that include competencies in primary healthcare, self-directed learning, leadership, and digital literacy. Strengthening the collaboration between accrediting bodies, universities, and industry stakeholders will support the development of a national curriculum framework, ensuring that paramedic graduates are equipped to meet the shifting demands of modern healthcare.

10.4.1 Competencies Required for Contemporary Paramedic Practice

Paramedicine has evolved significantly from its origins as a primarily emergency response profession to a broader role that includes primary healthcare, community-based practice, and interprofessional collaboration. As a result, paramedics require a diverse set of competencies that extend beyond clinical skills to include leadership, governance, and digital health literacy. These competencies are shaped by regulatory standards and accreditation frameworks, which define the foundational knowledge and skills required for professional practice. However, as paramedicine continues to expand into new areas of healthcare, competency frameworks must evolve to ensure that graduates are equipped for contemporary practice.

One of the core competencies required for paramedic practice is the ability to perform clinical assessments, emergency interventions, and critical decision-making in prehospital and out-of-hospital environments. The Paramedicine Accreditation Standards, set by the Paramedicine Accreditation Committee (PAC) and the Board of Australia (PBA), outline the need for paramedics to demonstrate proficiency in airway management, advanced life support, trauma care, and pharmacological interventions, ensuring safe and effective patient care in high-pressure situations (Ahpra, 2016). However, contemporary paramedic practice extends beyond acute emergency response. Paramedics are increasingly involved in primary healthcare, chronic disease management, and mental health support, necessitating the development of a broader skill set that includes preventive care, diagnostic reasoning, and patient education (O'Meara et al., 2017). The integration of paramedics into multidisciplinary teams, particularly in rural and remote healthcare settings, further highlights the importance of competencies in interprofessional collaboration and culturally competent care (Eaton et al., 2021).

In addition to clinical skills, leadership and governance have emerged as essential competencies for modern paramedics. Leadership in paramedicine encompasses the ability to make autonomous decisions in dynamic environments, supervise junior staff, and contribute to healthcare policy and system-wide improvements (Williams et al., 2021). Governance, on the other hand, involves understanding the regulatory frameworks that guide paramedic practice, ensuring compliance with legal and ethical standards, and participating in professional advocacy efforts to shape the future of the profession. While these competencies are increasingly recognised as crucial for paramedics, there remains significant variability in how leadership and governance training is embedded within university curricula. Some programs offer structured coursework in health system management and professional ethics, while others focus primarily on technical skill development, resulting in disparities in graduate preparedness for leadership roles (Smith, 2017).

The absence of structured social accountability within paramedic accreditation and education frameworks also raises significant concerns about the preparedness of graduates for contemporary practice (Kengis & Teed., 2025). Social Responsiveness is required within paramedic education to address broader societal responsibilities; current accreditation standards remain primarily focused on clinical competencies,

with limited emphasis on the social determinants of health, health inequities, and culturally responsive care. This gap is particularly concerning as paramedics increasingly operate in primary healthcare, chronic disease management, and mental health settings, where social and cultural factors significantly impact patient outcomes. The lack of a standardised national curriculum framework that explicitly integrates social accountability contributes to inconsistencies in graduate capabilities, potentially limiting the profession's ability to meet evolving healthcare demands. To ensure that paramedics are adequately prepared for these expanded roles, accreditation standards must evolve to incorporate structured training in social responsiveness, mirroring the approaches taken in nursing and medicine.

Digital health literacy is another competency that has become increasingly relevant in paramedicine, particularly with the rise of telehealth, electronic medical records, and remote patient monitoring. As healthcare systems integrate more digital tools, paramedics must be proficient in using electronic documentation systems, interpreting digital diagnostic tools, and engaging in virtual consultations with healthcare teams (Jackson et al., 2015). Despite its growing importance, digital health literacy is often overlooked in paramedic education, with limited formal training on how to navigate and apply digital health technologies in prehospital settings effectively (Eaton et al., 2021). Given the increasing reliance on digital tools for patient care coordination and data management, there is a need for paramedic programs to incorporate structured training in digital health competencies, ensuring that graduates can confidently operate in technology-enhanced healthcare environments.

Recent international developments further highlight the global shift in paramedicine towards integrated, community-focused care and the evolution of competency frameworks to support this transition. In Canada, Batt and colleagues have significantly contributed to modernising paramedic competencies, reshaping longstanding frameworks into contemporary, flexible models aligned with emerging healthcare demands (Batt et al., 2023). Additionally, their report presents a comprehensive vision for transforming the profession. It outlines ten guiding principles and six enabling factors that promote patient-centred, evidence-informed, and socially responsive paramedicine. The framework recognises the need for accountability, integration with broader health systems, and professional autonomy—elements that resonate with the findings of this thesis. Although the current study

focused primarily on Australasia and a select number of international jurisdictions, such Canadian contributions offer valuable comparative insights. Monitoring and integrating lessons from such frameworks into Australian paramedicine education could support more robust, future-ready curricula and contribute to global alignment in paramedicine practice.

The evolving nature of paramedicine has also led to significant discussions around role extension and role expansion, both of which influence the skill requirements for contemporary practice. Role extension refers to the expansion of an existing scope of practice, enabling paramedics to assume additional responsibilities within their traditional role. This may include expanded pharmacological interventions, advanced airway management techniques, or specialised skills, such as the use of ultrasound in prehospital settings (O'Meara et al., 2015). Role expansion, on the other hand, involves the introduction of entirely new responsibilities that redefine the role of paramedics within healthcare systems. Examples of role expansion include the development of community paramedics who provide in-home healthcare services, paramedic practitioners who operate in primary care settings, and extended care paramedics who work alongside general practitioners and aged care providers (Williams et al., 2021). As paramedics take on these expanded roles, competency frameworks must be regularly updated to ensure that education and training align with contemporary practice needs. However, accreditation processes often lag behind workforce development, creating gaps between paramedic education and real-world skill requirements (Smith, 2017).

Paramedics require a diverse and evolving set of competencies that encompass clinical expertise, leadership, governance, and digital health literacy. The expansion of paramedic roles beyond emergency response has increased the need for skills in primary healthcare, chronic disease management, and interdisciplinary collaboration. Additionally, the integration of technology into healthcare delivery has highlighted the importance of digital health literacy as a core competency for paramedics. As paramedicine continues to evolve, role extension and expansion will further shape the profession, necessitating continuous updates to accreditation standards and educational frameworks to ensure that graduates are equipped to meet the demands of contemporary practice. Addressing these competency requirements through a more structured and standardised approach to paramedic education will be essential in

maintaining high-quality patient care and supporting the future growth of the profession.

The increasing complexity and diversity of paramedic roles necessitate a curriculum that prepares graduates with both core clinical skills and the ability to adapt to emerging healthcare demands. Historically, paramedics were trained within a narrow emergency response framework; however, as the profession evolves, the required skillset has expanded to include primary healthcare, chronic disease management, mental health interventions, and interprofessional collaboration (O'Meara et al., 2016; Porter et al., 2020). The literature highlights the generalist role of paramedics, emphasising the need for broad-based competencies that extend beyond traditional prehospital care (Eaton et al., 2021).

A formal curriculum guidance document is essential to ensure paramedic education consistently develops the competencies required for contemporary practice. Unlike nursing and medicine, which have well-established national curriculum frameworks, paramedicine in Australia lacks a standardised educational framework that explicitly outlines the required graduate capabilities (Bell et al., 2021). The absence of comprehensive curriculum guidelines has contributed to variability in how universities prepare students for real-world practice, as identified in the analysis of the RESPIGHT framework conducted in this study.

The findings suggest five key competency domains should be prioritised in paramedic education:

1. Clinical Judgment and Decision-Making – Graduates must develop critical thinking skills that enable them to assess complex cases, particularly in low-resource or high-pressure environments (Hatlevik, 2012; Michau et al., 2009).

2. Interdisciplinary Collaboration – As paramedics increasingly work within multidisciplinary healthcare teams, strong communication, leadership, and teamwork skills are essential to ensure effective patient care. While interprofessional education (IPE) is included in accreditation standards, its current definition remains relatively narrow, often focusing on structured interactions rather than the broader, dynamic nature of collaborative healthcare practice. To fully prepare paramedics for their evolving roles, educational programs must adopt a more comprehensive approach to

IPE, integrating diverse learning experiences that reflect the complexity of real-world teamwork in emergency, primary, and community health settings (Porter et al., 2020).

3. Health and Social Care Integration – The generalist role of paramedics now includes managing chronic conditions, providing preventative care, and supporting public health initiatives, requiring more significant emphasis on community engagement and social determinants of health (O'Meara et al., 2015).

4. Governance and Ethical Practice – Professionalism, governance, and ethical decision-making are crucial in ensuring paramedics navigate regulatory requirements, particularly as their roles expand beyond emergency care. These competencies are already embedded within the Professional Capabilities for Registered Paramedics (Paramedicine Board of Australia, 2021); however, as the scope of practice continues to evolve, their application becomes increasingly complex. Paramedics must interpret and apply these standards in diverse healthcare settings, requiring ongoing education and professional development to ensure they meet emerging regulatory, ethical, and governance challenges across emergency, primary, and community care contexts (Smith, 2017).

5. Technological and Data Literacy – Integrating telehealth, AI, and digital health records into paramedicine requires paramedics to be proficient in technology-driven patient care and data-informed decision-making (Eaton et al., 2021).

The lack of a unified curriculum framework to ensure the systematic development of these competencies poses a risk to graduate preparedness and professional consistency. To address this gap, accreditation bodies such as the Paramedicine Board of Australia (PBA) should collaborate with universities and industry stakeholders to establish a national curriculum guidance document that aligns education with the evolving scope of practice. Future research should explore international competency frameworks to identify best practices in structuring paramedic education, ensuring that graduates are equipped to address contemporary healthcare challenges.

This alignment between education and practice is essential, yet the study highlights notable gaps in professional capability frameworks. Interestingly, two competency groupings emerged in the literature but were absent from these

frameworks, suggesting a need for greater emphasis on the evolving roles of paramedics.

Competency Frameworks and Accreditation Standards: Themes and Insights

The thesis provides critical insights into the competencies that underpin paramedicine education and practice. The study identified and categorised competency frameworks and assessment tools through thematic analysis, synthesising data into major analytical groupings. These groupings highlight both the strengths and areas for improvement within paramedicine education.

Key competency themes, such as accountability, clinical decision-making, professionalism, communication, teamwork, and situational awareness, align strongly with the domains of the Paramedic Board of Australia's (PBA) professional capabilities. However, the study also identified gaps in assessment, education, leadership, scene management, and self-directed practice, underscoring the need for continuous curriculum development to address these deficiencies.

The findings reinforce the importance of aligning educational outcomes with regulatory standards. They also emphasise the need to integrate underrepresented areas, such as the health and social continuum, leadership, and information literacy, into paramedicine curricula to better prepare graduates for expanded roles in community and primary care settings.

Recognising the need for continuous evolution in educational design, Stenhouse's (1975) notion of curricula as a process rather than a product reinforces the importance of aligning educational outcomes with regulatory standards. This perspective supports the integration of underrepresented areas, such as the health and social continuum, leadership, and information literacy, into paramedicine curricula to better prepare graduates for expanded roles in community and primary care settings. By adopting an iterative framework that blends systematic processes with dynamic, practice-oriented updates, curriculum development can remain responsive to accreditation standards and evolving professional needs (Edwards & Burns, 2016; Wensing, 2015).

10.4.2 Addressing Curriculum Gaps: The Role of the RESPIGHT Framework

The RESPIGHT framework offers a structured approach to identifying curriculum gaps in paramedic education, particularly in areas such as primary healthcare integration, leadership development, governance training, and digital literacy. By systematically assessing these elements, RESPIGHT highlights discrepancies between competency standards, accreditation requirements, and the real-world needs of the workforce (O'Meara et al., 2017). The literature suggests that while accreditation ensures minimum competency levels, it does not always translate into consistent educational content across universities (Smith, 2017). As a result, paramedic curricula often lack alignment with the profession's evolving scope, particularly in areas such as community paramedicine, chronic disease management, and interprofessional collaboration (Eaton et al., 2021). RESPIGHT is a diagnostic tool for identifying these inconsistencies, offering universities a roadmap for more effective curriculum mapping and alignment with industry demands.

A key contribution of the RESPIGHT framework is its ability to integrate pedagogical and theoretical frameworks into the design of paramedic curricula. Constructivist learning theory underpins RESPIGHT, advocating for active, student-centred learning that aligns with contemporary paramedic practice. This approach promotes the development of critical thinking, problem-solving, and adaptive expertise, essential skills in an evolving healthcare landscape (Mendes, 2019). By incorporating these educational theories, RESPIGHT provides a structured methodology for embedding relevant competencies into paramedic education, thereby addressing the gaps that arise from inconsistencies in accreditation implementation.

Paramedic practice continues to evolve in response to technological advancements, shifting healthcare demands, and societal factors. One significant trend is the growing emphasis on primary healthcare, driven by the increasing prevalence of chronic diseases, population aging, and disparities in rural healthcare access. Paramedics are now required to deliver non-emergency care, manage chronic conditions, and engage in interprofessional collaboration. This expansion necessitates embedding these competencies into paramedicine curricula to prepare graduates for broader roles. Theories of interprofessional education (IPE) and collaborative learning support the integration of these competencies by fostering shared knowledge and communication skills across healthcare disciplines (Mohammed et al., 2021). While

IPE is included in accreditation standards, its definition remains narrow, limiting its impact on curriculum development. RESPIGHT expands on this by encouraging a more comprehensive incorporation of IPE

Technological innovations, including telemedicine, electronic health records, and diagnostic tools, have reshaped paramedic practice. Graduates must develop digital literacy and integrate technology into clinical workflows. The global pandemic further underscored the critical role of paramedics in public health, emphasising the need for education in disaster preparedness, public health response, and community engagement. Applying frameworks such as digital learning theories (Barr et al., 2020) within RESPIGHT enables universities to integrate digital literacy and health informatics into paramedic education, ensuring that students develop the skills required for contemporary practice.

Compared to the UK and South Africa, these countries have made significant strides in integrating community paramedicine into their undergraduate curricula, reflecting the profession's shift toward preventive and holistic care models. In Australia, while the NRAS has facilitated the professionalisation of paramedicine, the lack of guidance on emerging areas, such as telehealth, leadership, and public health, remains a barrier to comprehensive educational reform. Additionally, there is a lack of regulation surrounding advanced practice.

Higher education plays a crucial role in meeting the evolving professional needs of paramedics. The transition to degree-level education has provided paramedics with a foundation in clinical knowledge, critical thinking, and professional practice. However, analysis of curricula across 18 Australian universities highlights a predominant focus on emergency response, with limited emphasis on primary healthcare, leadership, and community engagement.

To address this gap, introducing a recognised framework for paramedic accreditation offers a structured approach to standardising curricula and aligning educational outcomes with competency standards set by the PBA. This framework prioritises competencies such as professionalism, patient-centred care, and interprofessional education, reflecting the dynamic nature of healthcare delivery.

One of the key contributions of the RESPIGHT framework is its ability to streamline curriculum mapping processes, ensuring that academic content aligns with

accreditation standards while addressing workforce trends. Curriculum mapping is essential in identifying content gaps, redundancies, and missed opportunities for skill development (Ryan & Halliwell, 2012). The literature highlights that many universities struggle to balance technical skill training with broader competencies such as leadership, governance, and digital health literacy (Williams et al., 2021). Using RESPIGHT as a curriculum audit tool, institutions can pinpoint areas where content does not fully support contemporary paramedic roles, allowing for targeted modifications to subject structures and assessment strategies.

International comparisons reinforce the importance of competency-based education and interprofessional learning. The UK's College of Paramedics embeds professionalism and patient-focused teaching as core elements of paramedicine education, providing a template for Australia to adapt (College of Paramedics, 2019). Similarly, South Africa's tiered education model demonstrates how structured pathways can enhance professional development and career progression (Sobuwa & Christopher, 2019). These global perspectives underscore the need for paramedic education in Australia to expand beyond emergency response training and incorporate broader competencies, including governance, leadership, and primary healthcare. RESPIGHT facilitates this shift by integrating these elements into curriculum evaluation processes, ensuring that course content reflects contemporary professional expectations.

Future curriculum development in Australia must strike a balance between emergency response training and emerging competencies in public health, leadership, and technology. Strengthening collaboration between accrediting bodies, educational institutions, and industry stakeholders will ensure curricula remain responsive to evolving healthcare needs. Additionally, fostering localised research into paramedicine education and accreditation will provide evidence-based guidance for addressing gaps in competency frameworks.

By adopting internationally recognised accreditation principles and aligning with global best practices, paramedicine education in Australia can continue to evolve. This will ensure that graduates are equipped to meet the expanding and increasingly complex demands of contemporary healthcare. This approach will enhance patient care and reinforce the status of paramedicine as a vital component of the broader healthcare system.

The study identifies key areas where paramedicine curricula must evolve to meet contemporary healthcare needs. Research advocates for integrating community engagement and primary healthcare into paramedic training, yet gaps remain within Australian curricula (O'Meara et al., 2016; Eaton et al., 2021). Furthermore, paramedicine must expand beyond traditional emergency response to encompass governance and integration within the health system (O'Brien et al., 2014; Leggio et al., 2021). The weaker alignment in these areas suggests that current curricula may not adequately prepare graduates for the demands of contemporary practice, echoing concerns raised by Smith (2017) regarding the industry relevance of accreditation and curriculum standards.

Universities can apply RESPIGHT to enhance the integration of primary healthcare training, a known gap in many paramedic programs (O'Brien et al., 2014). Historically, paramedic education has focused on emergency response models. However, the increasing involvement of paramedics in chronic disease management and community-based healthcare requires a greater curricular emphasis on preventative care, patient education, and health system navigation (Eaton et al., 2021). RESPIGHT provides a framework for embedding these competencies across multiple subjects rather than confining them to standalone units. Similarly, leadership and governance education, often inconsistently integrated across programs, can be reinforced through RESPIGHT-driven curriculum mapping to ensure that graduates develop decision-making skills, ethical reasoning, and professional accountability (Smith, 2017).

Another significant curriculum gap identified in the literature is digital health literacy, an area becoming increasingly relevant as paramedicine incorporates telehealth, electronic medical records, and remote patient monitoring (Jackson et al., 2015). Despite its importance, digital health literacy is not a formalised competency in many paramedic accreditation frameworks, leading to inconsistent coverage across programs (Williams et al., 2021). By applying RESPIGHT, universities can ensure that digital health competencies are mapped across multiple units, allowing students to develop proficiency in using electronic health systems, interpreting digital diagnostic tools, and engaging in telemedicine practices.

A core function of the RESPIGHT framework is its application as a curriculum mapping tool to identify content gaps, redundancies, and missed opportunities for skill

development. RESPIGHT's structured approach enables institutions to pinpoint areas where curricula do not fully support contemporary paramedic roles, allowing for targeted modifications to subject structures and assessment strategies.

The study's findings reinforce the need for evolving paramedicine education frameworks in tandem with changes in healthcare delivery. Research advocates for integrating community engagement and primary healthcare into paramedic training, yet gaps remain within Australian curricula (O'Meara et al., 2016; Eaton et al., 2021). Similarly, there is an argument that paramedicine education should extend beyond emergency response to encompass broader healthcare skills (Grantham, 2004; O'Brien et al., 2014). However, this thesis also identifies micro-level curriculum gaps, aligning with Smith (2017) and Edwards (2011), who question whether current curricula fully meet workforce needs. The discrepancies in curriculum alignment across institutions suggest that accreditation bodies and educators must continuously review and adapt to maintain educational relevance. RESPIGHT provides a framework for embedding these competencies across multiple subjects rather than confining them to standalone units.

The RESPIGHT framework is valuable for universities seeking to improve curriculum mapping and ensure alignment with contemporary paramedic practice. By systematically evaluating gaps in primary healthcare, leadership, governance, and digital literacy, RESPIGHT enables institutions to develop more comprehensive and industry-aligned paramedic programs. The literature emphasises the importance of structured curriculum evaluation processes. RESPIGHT provides a practical methodology for ensuring graduates have the competencies required for modern, multidisciplinary healthcare environments. As paramedicine continues to evolve, the strategic application of RESPIGHT can support more effective curriculum design, accreditation alignment, and workforce preparedness.

By adopting internationally recognised accreditation principles and aligning with global best practices, paramedicine education in Australia can continue to evolve. This will ensure that graduates are equipped to meet the expanding and increasingly complex demands of contemporary healthcare. The application of pedagogical and theoretical frameworks within RESPIGHT strengthens its role as a comprehensive curriculum evaluation tool, bridging the gap between accreditation standards and real-world paramedic practice. This structured approach to curriculum design enhances

patient care and reinforces the status of paramedicine as a vital component of the broader healthcare system.

Building on the need for continuous curriculum adaptation, these findings further recognise the importance of adopting structured curriculum frameworks. Moving beyond reliance on competency benchmarks, a more formalised and consistent approach is essential to address the variations in educational standards and ensure graduate preparedness for evolving healthcare roles.

10.5 EDUCATIONAL MODELS & CURRICULUM DESIGN IN PARAMEDICINE

The design of paramedic education has evolved from traditional competency-based models to more comprehensive curriculum frameworks that integrate experiential learning, simulation, and adaptive expertise. Early paramedic education relied heavily on Competency-Based Training (CBT), which focused on skill acquisition and procedural proficiency (Perera et al., 2017). While CBT remains a fundamental aspect of paramedicine education, it has been critiqued for its reductionist approach, as it often assesses discrete technical skills rather than developing broader clinical reasoning and adaptability (Ryan & Halliwell, 2012). To address these limitations, contemporary paramedic education incorporates elements of Tyler's Model of Curriculum Design, which emphasises clearly defined learning objectives, assessment-driven instruction, and systematic curriculum development (Lee et al., 2013). However, Tyler's model, like CBT, has been criticised for focusing too narrowly on predefined outcomes rather than fostering critical thinking and problem-solving abilities essential for paramedicine's evolving scope of practice (O'Meara et al., 2015).

A more holistic approach to paramedic education involves integrating clinical judgment models, which prioritise decision-making, situational awareness, and reflective practice (Thompson et al., 2015). Unlike CBT and Tyler's model, clinical judgment approaches align more closely with real-world paramedic practice, where practitioners must adapt to unpredictable, high-stakes environments (Eaton et al., 2021). Research suggests that paramedic curricula should move beyond technical competency to emphasise higher-order thinking, leadership, and autonomous clinical reasoning (Smith, 2017). This shift is significant as paramedics increasingly operate

in community healthcare, primary care, and non-emergency settings, where decision-making occurs with less direct medical oversight (Williams et al., 2021).

Experiential learning plays a critical role in bridging the gap between theoretical knowledge and practical application. Simulation-based education, for instance, has become a cornerstone of paramedic education, enabling students to develop critical thinking skills, refine technical skills, and practice high-risk procedures in controlled environments (O'Meara et al., 2017). Simulation also enhances students' ability to apply theoretical knowledge in complex, unpredictable situations, an essential component of adaptive expertise (Thompson et al., 2015). The literature highlights the benefits of high-fidelity simulation, which replicates real-world clinical scenarios and provides learners with immediate feedback (Eaton et al., 2021). However, while simulation is effective, it must be complemented by real-world clinical placements, where students engage in direct patient care and interprofessional collaboration (O'Brien et al., 2014).

Another key approach in paramedic curriculum design is Problem-Based Learning (PBL), which encourages students to engage in active inquiry, develop clinical reasoning, and collaborate on complex patient cases (Ryan & Halliwell, 2012). Unlike traditional lecture-based models, PBL fosters self-directed learning and adaptability, which is essential for paramedics working in dynamic healthcare settings (Smith, 2017). Studies suggest that PBL improves knowledge retention and enhances students' ability to apply learning in diverse clinical environments (O'Meara et al., 2015). Given the evolving scope of paramedicine, universities must strike a balance between the structured nature of CBT and Tyler's Model and the flexibility of PBL and experiential learning to produce competent and adaptable paramedics (Eaton et al., 2021).

A significant challenge for paramedic education is striking a balance between technical skill development and adaptive expertise. While technical proficiency remains crucial, graduates must also demonstrate autonomy, professional judgment, and the ability to navigate complex healthcare systems (Williams et al., 2021). The literature suggests that paramedics are increasingly being required to work in expanded roles, such as community paramedicine, mental health intervention, and chronic disease management, necessitating a shift from rigid, competency-based frameworks to more flexible, problem-solving-oriented models (O'Meara et al., 2017). Universities

play a crucial role in achieving this balance by designing curricula that integrate structured skill development with experiential learning, leadership training, and digital health competencies (Smith, 2017).

Paramedic education has transitioned from a competency-based training model to a multifaceted approach that incorporates clinical judgment, experiential learning, and problem-solving methodologies. While CBT and Tyler's Model remain essential for structuring technical skill development, they must be complemented by PBL, simulation-based learning, and real-world clinical experience to prepare graduates for the unpredictable nature of contemporary paramedic practice. As the role of paramedics continues to expand, educational frameworks must evolve to ensure that graduates possess both technical expertise and the adaptive capabilities necessary for autonomous clinical practice. By integrating competency-based models with experiential and problem-solving approaches, universities can develop paramedics who are technically proficient and capable of critical thinking, leadership, and innovative problem-solving in complex healthcare environments.

10.5.1 Pedagogical and Theoretical Frameworks

The development of paramedic education relies on robust pedagogical and theoretical frameworks to ensure that curricula remain relevant to contemporary healthcare demands. As paramedicine transitions from a predominantly emergency response profession to a broader primary healthcare role, educational frameworks must integrate technical skill development and adaptive expertise. Theoretical grounding provides the foundation for curriculum design, instructional strategies, and competency development, ensuring that pedagogical approaches align with accreditation standards and workforce expectations. Various frameworks underpin paramedic education, including competency-based learning, problem-based learning (PBL), and experiential learning, each contributing to the development of clinical judgment, decision-making, and interdisciplinary collaboration. Within this broader pedagogical landscape, specific educational models have been developed for emergency medicine and primary healthcare training, reflecting the diverse and evolving scope of paramedic practice. Addressing these pedagogical frameworks is essential for creating structured, evidence-based curricula that prepare paramedics for dynamic, patient-centred healthcare environments.

Theoretical Grounding and Curriculum Relevance

Integrating the Dreyfus Model of Skill Acquisition into paramedicine curriculum evaluation provides a structured framework for assessing the progressive development of clinical competence. The Dreyfus Model describes five levels of skill acquisition—novice, advanced beginner, competent, proficient, and expert—each representing distinct cognitive and experiential learning milestones (Dreyfus., 2004). Applying this model to paramedicine education allows educators to map essential educational components to professional capabilities, ensuring students transition smoothly from theoretical learning to autonomous practice.

As highlighted in the literature review, paramedicine education in Australia has transitioned from a vocational training model to a higher education-based approach, emphasising a more structured and competency-driven approach (O'Brien et al., 2014). The shift towards university-led education necessitates a theoretical underpinning that supports the development of clinical judgment and decision-making skills, moving beyond competency-based assessments to more profound learning methodologies (Lee et al., 2013). The Dreyfus Model aligns well with this educational trajectory, as it supports a scaffolded learning approach where students advance through structured skill acquisition stages, reinforcing their ability to manage complex, real-world scenarios.

The increasing scope of practice for paramedics, including primary healthcare roles, community paramedicine, and critical care interventions, underscores the need for adaptable and responsive curricula (O'Meara et al., 2015). The literature supports the argument that curricula must evolve to reflect the expanding clinical responsibilities of the paramedic profession (Perona et al., 2019). A theoretically grounded curriculum, informed by frameworks such as the Dreyfus Model and constructivist learning theories, ensures that paramedic graduates possess foundational knowledge and the critical thinking skills necessary for meeting evolving healthcare demands.

Additionally, social constructivist theories, which emphasise knowledge acquisition through experience and social interaction (Vygotsky, 1978), further reinforce the need for experiential learning within paramedicine curricula. This aligns with current trends in paramedic education, integrating problem-based learning, simulation training, and clinical placements to bridge the gap between theoretical knowledge and real-world application (Eaton et al., 2021).

The thesis emphasises the significance of accreditation in maintaining high standards of education for paramedics. Nevertheless, it also points to gaps in the alignment between accreditation standards and emerging paramedic roles (Paramedicine Board of Australia, 2023). Given the dynamic nature of healthcare, curriculum development must be an ongoing process, ensuring that graduates are prepared for current roles and future healthcare challenges.

The Dreyfus Model and other educational frameworks offer a robust means of evaluating curricula against real-world professional competencies. By aligning curricula with competency progression models, accreditation bodies can ensure that education programs remain flexible and responsive to changes in healthcare delivery, regulatory requirements, and societal needs.

A theoretically informed approach to curriculum evaluation is essential for ensuring that paramedicine education remains relevant and responsive to the industry's needs. The Dreyfus Model, supported by constructivist learning theories, provides a structured yet flexible foundation for curriculum development. By continuously integrating educational theory with practical competency mapping, paramedic graduates can be better prepared to navigate the complexities of modern healthcare. This study underscores the importance of incorporating a theoretically consistent and adaptable framework into paramedicine curricula to support student development and the evolving professional landscape.

10.5.2 Pedagogical Approaches Supporting an Educational Framework

One of the thesis's primary objectives was to delineate the scope of paramedicine practice nationally and internationally. The literature highlights a rapidly evolving paramedicine landscape with an expanding scope of practice (Australasian College of Paramedicine, 2023); however, it also reveals a lack of a cohesive accreditation framework to support and guide these changes within educational curricula (Weber., et al., 2024). This gap highlights the crucial need for structured and responsive mechanisms to integrate emerging competencies into paramedic education.

While establishing clear frameworks is critical for curriculum consistency, the findings also stress the importance of a balanced approach that integrates emergency response and broader healthcare competencies. By prioritising the inclusion of emerging areas such as community engagement and primary healthcare, educational

institutions can ensure that paramedicine education remains responsive to the dynamic needs of the healthcare sector.

To further refine and validate the essential components of paramedic education, the Delphi methodology employed in this study achieved expert consensus on the key subjects required for preparing students to meet current and future practice demands. Engaging paramedic academics from Australia and New Zealand, the Delphi study methodically identified, ranked and validated the subjects most crucial for developing competent, adaptable, and independent clinicians. By employing iterative rounds of surveys and Likert-scale scoring (requiring a consensus score above 4.5), the study successfully prioritised subjects that reflect the evolving professional landscape of paramedicine.

The findings provide a robust theoretical foundation for curriculum design, accreditation standards, and policy development. By identifying core curriculum components and their significance, the study establishes benchmarks for accreditation bodies to evaluate paramedicine education programs effectively. These benchmarks ensure that programs meet the criteria to produce graduates capable of addressing contemporary healthcare challenges.

These findings establish a robust theoretical foundation for curriculum design, accreditation standards, and policy development and set clear benchmarks for evaluating paramedicine education programs. By ensuring that graduates are equipped to address contemporary healthcare challenges, these benchmarks support the ongoing evolution of paramedic practice. This study identifies and categorises competency frameworks and assessment tools through thematic analysis, highlighting strengths and areas for improvement within paramedicine education.

Pedagogical Frameworks

Establishing an educational framework for Paramedicine offers a pathway to overcoming current challenges in curriculum development. By contextualising theoretical frameworks within a standardised yet adaptable structure, a paramedicine framework could balance professional consistency with responsiveness, ultimately equipping graduates with the skills needed to thrive in an evolving healthcare landscape.

Pedagogical frameworks are essential for guiding the design, implementation, and assessment of educational practices (Guerriero, 2017). These frameworks encapsulate the principles, theories, and methodologies that inform teaching and learning within specific professional contexts. This section explores pedagogical frameworks relevant to emergency medicine, primary healthcare, and outcomes-based curricula. By examining these frameworks, we aim to highlight the diverse approaches integral to effective education in these fields while addressing the professional development needed to achieve key learning outcomes.

In addition to their relevance to emergency medicine, primary healthcare, and outcomes-based curricula, these pedagogical frameworks also serve a critical role in shaping an educational framework for paramedicine. Understanding the framework is crucial for educators, as it provides insights into the unique challenges, goals, and values associated with the paramedic profession, ultimately informing the development of effective teaching strategies and curriculum design.

Emergency Medicine Pedagogical Frameworks

Paramedicine has traditionally emphasised the acquisition of clinical skills, requiring practitioners to achieve defined competencies. However, as the profession evolves, there is an increasing focus on developing critical thinking, problem-solving, and decision-making skills to ensure paramedics can operate effectively in complex and dynamic healthcare environments. Research, including findings from the Delphi study and historical perspectives, suggests that paramedic practice often aligns with frameworks commonly applied in emergency medicine, particularly in out-of-hospital settings (Campeau, 2008). Despite the significant emphasis on clinical skills training, evidence indicates that only one university in the paramedicine education landscape has implemented an evidence-based pedagogical framework for clinical competency. The Dreyfus Model of Skills Competency framework has been utilised in a regional Queensland university, as discussed in Chapter 4, Paper 6.

The Dreyfus Model is widely used for (a) assessing and supporting the progression of skill development and (b) defining acceptable competency levels (Dreyfus, 2004). In the pre-clinical phase, students, having had no experience with the performance expectations, are considered novices. Novices are taught fundamental skills and procedures, which are context-free and do not rely on specific case management scenarios. The students' progress by gaining experience, applying their

skills, and gradually advancing through stages of competency: from novice to advanced beginner, competence, proficiency, and eventually, expertise.

As students' progress to their second year, the transition marks a move from the advanced beginner stage towards competence. Advanced beginners can demonstrate marginally acceptable performance, having encountered enough real-world or simulated scenarios where a mentor has pointed out key situational elements. In their final clinical year, students reach the proficiency stage, where they begin to perceive situations holistically. Proficient student paramedics understand what to expect in typical scenarios and adapt their plans accordingly. Their decision-making is informed by prior experience, and they can recognise when situations deviate from the expected.

The Dreyfus Model of Skills Competency plays a crucial role in developing paramedic professionals who can adapt to evolving scopes of practice. This model underscores the importance of continuous skill refinement, enabling practitioners to become adaptable and flexible. Aligning with the findings of this study, the Dreyfus Model provides a structured approach for assessing paramedicine competencies, which are essential for meeting national accreditation standards.

The Dreyfus Model's emphasis on ongoing learning and skill enhancement complements the evolving nature of paramedicine practice. Accreditation frameworks that focus on intellectual skills, safety, accountability, clinical decision-making, professionalism, communication, teamwork, and situational awareness are essential in enhancing the quality of paramedic practice. Integrating the Dreyfus Model into paramedicine education ensures that professionals develop the competencies necessary to meet current and future demands in the field, thereby enhancing the quality of care they provide.

The Dreyfus Model aligns with a framework for paramedicine, incorporating tier one, tier two, and tier three surface structures. At the tier one level, the model supports continuous learning and skill refinement, fostering an environment of ongoing improvement. At tier two, it emphasises essential skills and professionalism, facilitating the development of competencies in clinical decision-making, communication, and teamwork. In the third tier, the model provides a structured framework for clinical judgment, enabling paramedics to adapt to changes in their scope of practice. Accreditation frameworks help establish the standards for these competencies, ensuring the delivery of high-quality care.

The Dreyfus Model's tiered structure aligns with a framework for paramedicine education and reflects the growing complexity and expansion of paramedic practice. As the scope of paramedicine broadens, particularly with the integration of primary and public healthcare, paramedics are increasingly recognised as integral members of the healthcare team.

Primary Health Care Pedagogical Frameworks

As paramedic practice evolves, integrating primary and public healthcare into the role has gained significant traction. Competence in primary care is increasingly valued within paramedicine, positioning paramedics as key contributors to the primary healthcare team (Naccarella et al., 2013). Paramedicine is now recognised as essential in enhancing the capacity and availability of healthcare providers, improving the quality of patient care, and broadening the scope of healthcare delivery (Naccarella et al., 2013).

The growing role of paramedics in primary care aligns with the framework for paramedicine education, which encompasses training in emergency response and primary healthcare skills, including health assessment, chronic disease management, and preventive care. This evolution reflects a broader focus on paramedicine education, incorporating community health, health promotion, and population-based interventions. Paramedics are increasingly required to navigate complex healthcare systems, which aligns with a National Educational Taxonomy that emphasises systems thinking and interdisciplinary collaboration (Lucas & Naccarella, 2015).

This emphasis aligns with the National Educational Taxonomy (NET), a framework developed to guide curriculum design by articulating the cognitive, interpersonal, and intrapersonal skills required of graduates in complex, evolving professional environments. NET underscores the importance of systems thinking, problem-solving, and adaptive expertise—capabilities that are increasingly essential for paramedics operating at the interface of emergency, primary, and community care. By embedding NET principles, paramedicine education can better equip graduates to respond to dynamic healthcare needs through integrated, collaborative practice.

Adopting a complex adaptive system framework (Miller & Page, 2009) highlights the interconnected nature of healthcare delivery. In this ecosystem, paramedics must work collaboratively within broader healthcare teams, making

systems thinking and interdisciplinary collaboration essential components of their education. Critical theory, primarily applied in rural health education (Reid, 2011), provides a robust foundation for developing a framework for paramedicine education. This framework can address the challenges faced by paramedics, particularly at the intersection of emergency medicine and primary healthcare, helping to shape the future of paramedic education.

Building on the foundation of critical theory and complex adaptive systems, the evolving landscape of paramedicine education calls for a shift towards outcomes-based curriculum frameworks. As paramedics navigate an increasingly interconnected healthcare ecosystem, an outcomes-based approach ensures that the curriculum aligns with the essential competencies required for effective collaboration within broader healthcare teams.

Outcomes-Based Curriculum Framework

The rapidly evolving field of paramedicine education necessitates a shift towards outcomes-based curriculum frameworks. This approach focuses on defining specific learning outcomes and aligning educational activities to ensure that these outcomes are achieved (Xing & Chen, 2019). An outcomes-based curriculum clarifies educational objectives, enhances student engagement, promotes continuous improvement, and ensures that education remains relevant to societal needs (Tam, 2014).

In an outcomes-based framework, clear and quantifiable learning outcomes are central, specifying the knowledge, skills, and competencies students must acquire by the end of their courses. Unlike traditional curriculum models prioritising content coverage, an outcomes-based approach focuses on mastering essential competencies and skills. This approach is especially relevant for paramedicine, where real-world scenarios and interdisciplinary perspectives enrich learning and ensure students are well-prepared for the demands of their profession.

Integrating an outcomes-based curriculum within a framework for paramedicine education offers numerous benefits for students, educators, and educational institutions. For students, clear learning objectives provide direction, enhancing motivation and promoting a comprehensive understanding of the subject matter. For educators, outcomes-based frameworks provide a structured approach to curriculum

design, assessment, and feedback, enabling more effective interventions to enhance student learning. Educational institutions benefit from the clarity provided by these frameworks, which enhances accountability, streamlines accreditation processes, and improves program effectiveness.

While earlier chapters focused primarily on regulatory, institutional, and professional stakeholders in shaping paramedicine education, the inclusion of patient-focused teachings within the outcomes-based curriculum framework reflects a deliberate reorientation towards community needs and expectations. Recognising the community as a significant stakeholder acknowledges that paramedicine operates within a broader societal context, where patient experiences, health equity, and culturally responsive care are central to contemporary healthcare delivery. Embedding these dimensions within learning outcomes ensures that graduates are not only clinically competent but also socially accountable and responsive to diverse populations. This patient- and community-centred emphasis aligns paramedicine education with global trends in health professional training, where the voices of service users are increasingly influential in shaping curricula and defining professional standards.

Building on the benefits of an outcomes-based curriculum within a framework for paramedicine education, the findings stress the importance of a balanced approach that integrates emergency response and broader healthcare competencies. By prioritising community engagement, primary healthcare, and governance, educational institutions can better equip graduates for the dynamic and expanding healthcare landscape.

10.6 ADDRESSING CURRICULUM GAPS: THE RESPIGHT FRAMEWORK

10.6.1 Implications for Paramedic Education and Practice

Expanding the scope of practice for paramedicine has significant implications for curriculum development, necessitating a shift from traditional emergency response training to a more comprehensive and integrated approach to healthcare. Historically, paramedics were trained within a narrow, acute-care model, focusing primarily on stabilisation and transport (Moritz, 2018). However, as paramedics assume extended and expanded roles, including primary healthcare, chronic disease management,

mental health interventions, and telehealth services, curricula must adapt to reflect these evolving professional responsibilities (O'Meara et al., 2016; Porter et al., 2020).

The literature distinguishes between role extension, which involves broadening the capabilities within an existing role, and role expansion, which introduces entirely new responsibilities; both require curriculum reform (Kopanos, 2014). In Australia, Critical Care Paramedics (CCPs) and Extended Care Paramedics (ECPs) represent role extensions as they build upon existing paramedic competencies to deliver more advanced care (Emergency Medicine Foundation, 2021). Conversely, Community Paramedics (CPs) exemplify role expansion, moving beyond emergency response to include preventive care, health promotion, and multidisciplinary collaboration (Eaton et al., 2021). These shifts highlight the need for competency-based education models that prepare graduates for emerging healthcare roles.

The RESPIGHT framework analysis in this study revealed inconsistencies in how Australian universities integrate primary care, governance, and leadership, key competencies that underpin an expanded paramedic role. While some institutions have incorporated community-based and preventive healthcare training, others remain anchored in traditional emergency care models, resulting in a mismatch between educational and practice demands (Porter et al., 2020). Without a structured, standardised approach to curriculum development, paramedic graduates may enter the workforce underprepared for the increasingly diverse healthcare environments in which they are expected to operate.

To ensure graduate readiness, curriculum design must emphasise lifelong learning, adaptability, and interdisciplinary collaboration. The nursing profession offers a relevant model where national competency frameworks have guided curriculum development to reflect the changing healthcare landscape (Boore & Deeny, 2012). For paramedicine, a similar approach, where accreditation bodies, educators, and industry leaders co-develop competency frameworks, could better align education with the realities of contemporary practice. Future research should explore international benchmarking to identify best practices in curriculum adaptation, ensuring that paramedicine education remains responsive to evolving healthcare needs.

The findings underscore the need for a balanced curriculum that integrates emergency response with broader healthcare competencies. Educational institutions

should prioritise the inclusion of community engagement, primary healthcare, and governance to better prepare graduates for the dynamic healthcare landscape. The existing literature supports a structured, competency-based education model that adapts to emerging healthcare needs (Thompson et al., 2015). Further research is needed to refine the mapping process and enhance the effectiveness of paramedicine education, ensuring that graduates are equipped to meet the evolving demands of healthcare.

The evolving scope of paramedic practice necessitates the development of competencies beyond clinical skills. Emphasising governance, leadership, and self-directed practice will equip paramedics with the skills needed for integrated healthcare delivery and policy development. Findings from 68 paramedic academics featured critical categories crucial for student preparedness, revealing both macro-level alignment and micro-level gaps in curricula. The analysis of curricula from sixteen institutions against the RESPIGHT framework highlighted varying degrees of alignment and current trends in paramedicine education, reinforcing the need for continuous curriculum evaluation and adaptation.

The analysis of curricula from 18 institutions, along with input from 68 paramedic academics, highlights the necessity for ongoing curriculum evaluation and adaptation in response to the expanding scope of paramedic practice. This aligns with the need for accreditation bodies to revise competency frameworks, ensuring they reflect the broader role of paramedics in healthcare.

10.6.2 Models of Care and Their Influence on Paramedic Education

The evolution of paramedicine education must be considered within the broader context of contemporary healthcare models, which influence curriculum design and graduate preparedness. Internationally, paramedicine has traditionally operated within two dominant prehospital care models: the Anglo-American and Franco-German models (Al-Shaqsi, 2010). The Anglo-American model, commonly referred to as a “scoop and run” approach, prioritises rapid transportation to hospital-based care, with paramedics focusing primarily on stabilisation and transport. In contrast, the Franco-German model follows a “stay and stabilise” philosophy, where advanced life support is provided on the scene, often under the supervision of emergency physicians (Al-Shaqsi, 2010).

Australia and New Zealand have adopted a hybrid approach, drawing elements from both models while increasingly incorporating primary and community healthcare frameworks (Page et al., 2013; Eaton et al., 2021). This transition reflects a growing recognition of paramedics' role in managing chronic conditions, providing preventative care, and supporting community-based interventions (O'Meara et al., 2016). However, this shift challenges traditional paramedic education, which historically emphasises emergency response and acute care (Grantham, 2004).

The findings of this study highlight the necessity for curricula that prepare graduates not only for emergency scenarios but also for broader healthcare responsibilities. The RESPIGHT framework analysis revealed inconsistencies in how Australian universities integrate key domains such as primary healthcare, governance, and interdisciplinary collaboration. This variability suggests that while some programs adapt to contemporary healthcare needs, others remain anchored in outdated models that do not fully reflect the expanded scope of paramedicine (Porter et al., 2020).

The findings from Eaton et al. (2025) reinforce the need for paramedic education to adapt to changing healthcare models. As paramedics increasingly transition into primary care roles, university curricula, accreditation standards, and competency frameworks must reflect this shift. While emergency response skills remain foundational, contemporary practice demands a broader skill set, including primary healthcare competencies, chronic disease management, and interdisciplinary collaboration (Eaton et al., 2021).

The realist evaluation conducted by Eaton et al. (2025) provides valuable insights into how paramedics integrate into primary care teams, identifying both barriers and facilitators to this transition. One of the key challenges identified is the lack of structured educational pathways that prepare paramedics for non-acute, community-based roles. This aligns with previous research indicating that many paramedic programs do not sufficiently incorporate primary healthcare content, resulting in graduates who are competent in emergency care but underprepared for non-traditional paramedic roles (Smith, 2017).

To address these gaps, universities should leverage curriculum mapping tools such as the RESPIGHT framework to ensure greater alignment between academic training and workforce needs. This study also suggests that accreditation standards should be revised to recognise primary healthcare competencies within paramedic

education explicitly. Additionally, experiential learning opportunities in primary care settings—such as clinical placements in general practice, aged care, and telehealth services—should be expanded to provide students with first-hand exposure to community-based care.

The RESPIGHT framework analysis strongly emphasised emergency response, accounting for 63.49% of curriculum content. However, other critical areas, such as community engagement (3.97%) and governance (4.76%), were significantly underrepresented. These findings suggest that current paramedicine curricula predominantly focus on traditional paramedic roles, with limited preparation for emerging responsibilities in primary healthcare and community-based care models.

The RESPIGHT model offers a comprehensive approach to paramedicine education, encompassing various domains such as emergency response, community engagement, situated practice, primary healthcare, integration with health and social services, governance and leadership, higher education, and treatment and transport. The study's findings underscore the necessity for curricula to be adaptable and responsive to these interconnected domains, ensuring that graduates are prepared for the evolving responsibilities of modern paramedic practice.

The findings also indicate macro-level alignment between curricula and established domains of paramedic practice, yet notable micro-level gaps persist. The Delphi process highlighted essential components necessary for student preparedness, reinforcing the need for a comprehensive curriculum that supports diverse healthcare roles beyond emergency response.

The study’s findings align with existing literature, emphasising the need for dynamic and adaptable paramedicine education. O'Meara et al. (2012) and Newton et al. (2020) stress the importance of equipping graduates with technical expertise and the ability to navigate complex healthcare environments. Similarly, research by O’Meara et al. (2017) and Eaton et al. (2021) highlights the growing role of paramedics in primary healthcare, necessitating an adaptation of the curriculum to incorporate these competencies.

By integrating the Delphi process and the RESPIGHT model, this study provides empirical evidence on paramedicine curricula in Australian higher education. The findings contribute to the ongoing debate over the relevance of paramedicine education

by offering a comprehensive analysis of curriculum evolution since 2018. This analysis highlights key areas requiring curriculum adaptation to prepare graduates for contemporary practice.

Building on this empirical analysis, integrating the Dreyfus model and other theoretical frameworks further strengthens the foundation for curriculum evaluation and refinement. By mapping essential educational components to professional capabilities, this study underscores the importance of developing practical and adaptable curricula that prepare paramedic graduates for the complexities of modern healthcare.

A structured competency-based curriculum, informed by healthcare models that reflect current practice, is essential for ensuring graduate readiness. Nursing education has demonstrated how national accreditation schemes can drive curriculum reform, ensuring alignment with evolving professional responsibilities (Boore & Deeny, 2012). Similarly, paramedicine curricula must be continually reviewed and adapted to ensure that graduates possess the skills necessary to navigate an increasingly integrated healthcare system. Future research should explore international benchmarking to identify best practices in paramedic education and ensure Australian programs remain responsive to emerging healthcare trends.

10.6.3 Constructing a Theoretical Framework for Future Paramedic Practice, Policy, and Implementation

A key objective of this study was to delineate the scope of paramedicine practice nationally and internationally. The literature highlights a rapidly evolving paramedicine landscape with an expanding scope of practice; however, it also reveals a lack of a cohesive accreditation framework to support and guide these changes within educational curricula. This gap highlights the crucial need for structured and responsive mechanisms to integrate emerging competencies into paramedic education.

To further explore the implications of the study's findings, the following recommendations are proposed:

1. Curriculum Enhancement
    - Universities should review and revise paramedicine curricula to strengthen alignment with community engagement, primary healthcare, and governance components of the RESPIGHT model.

- Institutions should refine paramedicine curricula to enhance integration with primary healthcare competencies and interprofessional collaboration.
- Explore the integration of emerging healthcare technologies, interprofessional education, and community-based care models into paramedic training programs.

2. Stakeholder Engagement and Collaboration
   - Conduct research involving paramedic graduates, educators, and industry professionals to identify specific gaps in current curricula and inform future program enhancements.
   - Engage industry stakeholders, accreditation bodies, and education providers in revising professional capabilities to reflect evolving roles and competencies.
   - Regular consultation with paramedic professionals, accreditation bodies, and policymakers is needed to ensure curricula remain aligned with industry expectations and future workforce needs.
3. Competency-Based Training and Assessment Models
   - Develop and implement competency-based training models incorporating governance, leadership, and health system integration.
   - Develop and implement improved assessment tools to measure student preparedness across all RESPIGHT domains, with a focus on community-based care.
   - Develop and test assessment models incorporating competencies such as the Health and Social Continuum and Self-Directed Practice.
4. Empirical Validation and Longitudinal Studies
   - Conduct qualitative and quantitative research with paramedics and educators to validate competency frameworks and ensure alignment with real-world practice.
   - Conduct longitudinal studies to track graduates' preparedness and performance in community care roles, validating the effectiveness of the curriculum.

- Investigate how paramedic graduates adapt to the evolving scope of practice and assess the long-term impact of different accreditation models on professional competence.

5. Comparative Framework Development and International Benchmarking
   - Establish an internationally recognised framework for paramedic accreditation that balances regulatory oversight with curricular flexibility, promoting best practices across jurisdictions.
   - Conduct international comparisons of accreditation frameworks to identify best practices for competency-based paramedic education.
   - Examine international paramedicine curricula to identify best practices and inform the development of the Australian curriculum.
6. Policy Reform and Continuous Accreditation Review
   - Advocate for the periodic review and updating of accreditation standards to ensure they remain responsive to emerging trends in healthcare and the evolving needs of the workforce.
   - Regulatory bodies must establish formal channels for industry feedback to ensure that accreditation guidelines reflect contemporary paramedic practice.
   - Develop structured mechanisms for periodic review and revision of accreditation standards to ensure relevance and effectiveness in an evolving healthcare landscape.
   - By implementing these recommendations, paramedicine education can remain dynamic and responsive, ensuring that graduates are well-equipped to meet the evolving demands of healthcare and community-based practice.

10.6.4 Integrating Theoretical Frameworks: The Dreyfus Model and the RESPIGHT Framework

To enhance the robustness of our recommendations, it is essential to integrate established theoretical frameworks that provide a structured approach to skill development and competency assessment. Two such frameworks, the Dreyfus Model of Skills Acquisition and the RESPIGHT framework, offer valuable insights into the

progression of paramedic competencies and the alignment of educational outcomes with professional standards.

The Dreyfus Model of Skills Acquisition

The Dreyfus Model, developed by Stuart and Hubert Dreyfus, outlines a five-stage process through which individuals progress from novice to expert in acquiring skills. This model is particularly relevant to paramedicine education, emphasising the importance of experiential learning and the gradual development of clinical competencies.

By incorporating the Dreyfus Model into paramedicine education, we can ensure a structured progression of skill development, enabling graduates to achieve the necessary competencies for effective practice. This model also highlights the importance of continuous learning and professional development, which aligns with the dynamic nature of healthcare.

In alignment with the Dreyfus Model's emphasis on continuous learning, the RESPIGHT framework further supports the structured development of competencies in paramedicine. By offering a comprehensive approach to curriculum design and competency assessment, RESPIGHT ensures that the key domains crucial for effective paramedic practice are systematically integrated, thereby fostering well-rounded professionals who can adapt to the evolving healthcare landscape.

The RESPIGHT Framework

The RESPIGHT framework provides a comprehensive approach to curriculum design and competency assessment in paramedicine. It emphasises the integration of key domains essential for paramedic practice, including:

Integrating the RESPIGHT framework into paramedicine curricula ensures that educational programs address the multifaceted nature of paramedic practice. By aligning curriculum components with these domains, we can better prepare graduates for the complexities of modern healthcare and enhance their ability to deliver high-quality care.

10.6.5 Paramedicine Educational Framework

Incorporating the Dreyfus Model of Skills Acquisition and the RESPIGHT framework into paramedicine education provides a robust foundation for curriculum

development and competency assessment. These theoretical frameworks offer structured approaches to skill progression and highlight the essential domains of paramedic practice. By embedding these frameworks into our recommendations, we can ensure that paramedicine education remains responsive to evolving healthcare needs and prepares graduates for the diverse challenges they will encounter in their professional careers.

This thesis, drawing on the evaluation's findings, aimed to establish a theoretical foundation to inform future developments in paramedic practice, accreditation, and curriculum design.

By exploring theoretical frameworks like critical theory and critical pedagogy, the thesis addressed the need for paramedic education to foster critical thinking skills essential for evolving paramedic roles. It also evaluates the current educational framework in Australia, compares it with international standards, and proposes theoretical foundations for future improvements, aligning with the overarching research question and objectives.

The lack of accreditation frameworks that reinforce paramedicine curriculum development is not a startling revelation. Since paramedicine has evolved from an infancy stage in higher education to a more mature life cycle, the curriculum as a field of inquiry in higher education research has also progressed slowly. Paramedic academics should become more aware of conceptual frameworks that form curriculum development that is (1) skill-based, (2) a patient-focused approach to curriculum design, and (3) enhances the clinical judgement abilities of paramedic students, as identified in the third tier of the paramedicine framework schematic in Figure 5.3 paramedicine curriculum is an outcomes-based course that reflects the patient care outcomes in the field. The curriculum should also be flexible in response to paramedics' evolving practice and accommodate the nuances of higher education institutions' learning, teaching, and assessment approaches. These broad concepts of what defines paramedicine also shape a paramedic's own identity. Therefore, a curriculum based on the three factors mentioned above can shape the profession currently and into the future.

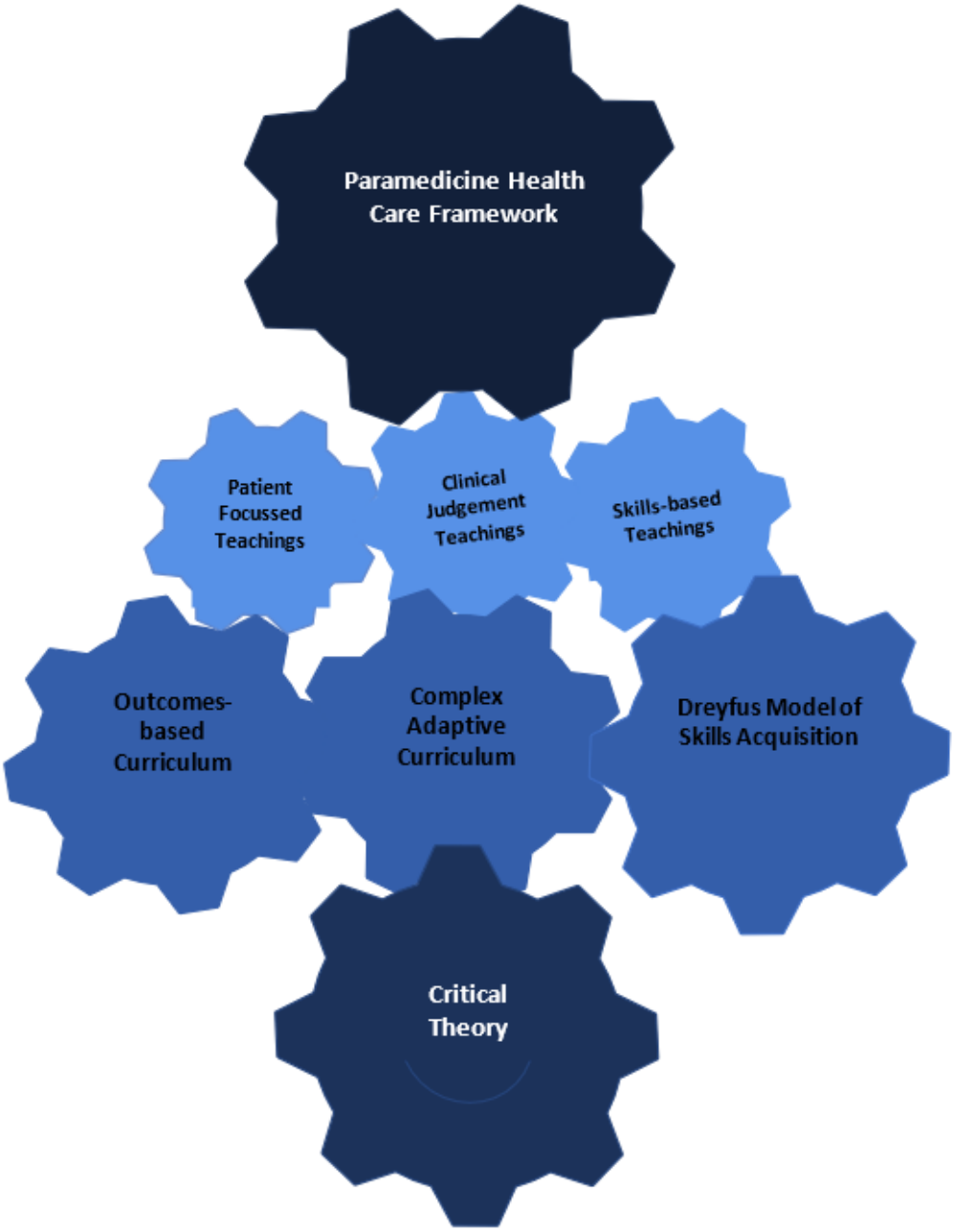

Figure 5.1 Paramedicine Healthcare Framework

10.6.6 The Role of Collaborative Efforts

A key finding of this study is that the evolution of paramedicine practice cannot be managed in isolation by any single stakeholder. The literature supports this by highlighting the interdependence between professional regulation, education, and workforce readiness (Australian Health Practitioner Regulation Agency, 2016). The transition from vocational training to university-based education has been instrumental

in professionalising paramedicine, but ongoing collaboration is required to maintain educational and clinical relevance (O'Brien et al., 2014).

The study's findings suggest that paramedic services must be more active in shaping educational curricula to ensure alignment with real-world practice. Similarly, tertiary institutions must engage with regulatory authorities and industry leaders to anticipate and integrate emerging competencies into paramedic education (Leggio et al., 2021). This aligns with the broader literature advocating for curriculum co-design to enhance graduate employability and professional preparedness (Thompson et al., 2015).

The study's findings have significant policy implications, particularly regarding accreditation processes and curriculum development. The need for a structured mechanism to periodically review and revise accreditation standards is evident. Regulatory bodies must establish formal channels for industry feedback to ensure that accreditation guidelines reflect contemporary paramedic practice.

Furthermore, additional research is needed to investigate the effectiveness of current educational models in preparing graduates for non-traditional paramedic roles. Comparative studies examining international approaches to paramedic education and accreditation could provide valuable insights into best practices for ensuring adaptability within the profession.

The study's findings underscore the need to continually review and refine paramedic competency frameworks. Regulatory authorities and accreditation bodies must consider incorporating Health and Social Continuum and Self-Directed Practice into professional capabilities to ensure that paramedic education reflects contemporary healthcare needs. This aligns with the broader challenge paramedicine education faces in adapting curricula to the profession's evolving scope, further underscoring the importance of a structured and responsive approach to curriculum design.

10.6.7 Recommendations for Curriculum Development

The evolution of paramedicine education requires a structured and collaborative approach to curriculum development, ensuring alignment with global best practices, emerging healthcare trends, and regulatory standards. The literature highlights Australia's lack of a unified curriculum framework, contributing to inconsistencies in

graduate preparedness across institutions (Leggio et al., 2021). To address these gaps, a set of strategic recommendations is proposed:

1. Establish a National Curriculum Guidance Document

Unlike nursing and medicine, paramedicine in Australia lacks a standardised curriculum framework to ensure consistency in graduate capabilities (Boore & Deeny, 2012). A national curriculum guidance document, developed collaboratively by the Paramedicine Board of Australia (PBA), accreditation bodies, universities, and industry stakeholders, should:

- Define core competencies and learning outcomes for undergraduate programs in paramedicine.
- Guide the integration of emerging healthcare roles, including primary care, chronic disease management, and telehealth (O'Meara et al., 2016).
- Align with international accreditation standards, incorporating insights from models such as the UK College of Paramedics' curriculum framework (Paramedics Australasia, 2014).

2. Strengthen Competency-Based and Clinical Judgment Training

Traditional competency-based training (CBT) models primarily focus on the acquisition of technical skills; however, contemporary paramedic practice requires higher-order clinical judgment, adaptability, and decision-making skills (Michau et al., 2009). To enhance graduate preparedness, curricula should:

- Integrate case-based and problem-based learning (PBL) to develop critical thinking and decision-making abilities (Hatlevik, 2012).
- Expand simulation-based training to bridge the gap between theoretical knowledge and real-world practice (Perona et al., 2019).
- Embed reflective practice and debriefing strategies to ensure paramedics develop self-regulation and continuous learning habits (Ryan & Halliwell, 2012).

3. Enhance Interdisciplinary and Stakeholder Collaboration

As paramedics increasingly operate within multidisciplinary healthcare teams, curricula must prepare students for interprofessional collaboration and leadership roles (Porter et al., 2020). Recommendations include:

- Embedding interdisciplinary training modules that promote collaboration among nurses, physicians, allied health professionals, and social workers (Eaton et al., 2021).
- Establishing structured clinical placements that expose students to diverse healthcare settings, including primary care, community health, and telehealth.
- Encouraging stakeholder engagement by involving healthcare providers, policymakers, and industry leaders in curriculum reviews to ensure alignment with workforce demands (Smith, 2017).

4. Integrate Emerging Technologies and Data Literacy

Digital transformation is reshaping healthcare delivery, and paramedic graduates must be equipped to navigate technology-driven patient care (Eaton et al., 2021). To align with global trends, curricula should:

- Introduce training in electronic health records (EHRs), artificial intelligence (AI), and digital diagnostics.
- Expand the use of telehealth training to ensure paramedics can effectively deliver remote patient care and virtual triage services.
- Develop data literacy competencies, enabling paramedics to utilise health informatics for evidence-based decision-making.

5. Implement Continuous Curriculum Review and Accreditation Updates

Given the rapidly evolving scope of practice, paramedicine curricula must be regularly reviewed to remain relevant. This requires:

- A formalised process for periodic curriculum review, integrating feedback from graduates, employers, and industry stakeholders.
- Stronger alignment between accreditation frameworks and workforce needs, ensuring curricula reflect emerging paramedic roles and patient care models (World Health Organization, 2019).

- Exploring international accreditation benchmarks, such as the UK Health and Care Professions Council (HCPC) and Canadian Paramedic Association models, to adopt best practices in curriculum development and graduate competency assessment.

These recommendations emphasise the need for a structured, competency-driven approach to curriculum development, ensuring that paramedic education remains responsive, interdisciplinary, and technologically integrated. By fostering stakeholder collaboration and aligning with global best practices, paramedicine curricula can effectively prepare graduates for an increasingly complex and evolving healthcare landscape.

10.7 FUTURE RESEARCH AND POLICY DIRECTIONS

This study has several limitations. First, it focuses primarily on Jurisdictional Ambulance Services (JAS), which, while representing the dominant employer of paramedics in Australasia, excludes in-depth consideration of non-JAS settings. This focus was shaped by graduate employment trends and the availability of consistent data. However, future research could explore how paramedicine curricula prepare graduates for emerging roles in diverse healthcare contexts beyond JAS.

Second, the analysis was limited to publicly accessible curriculum documents. Although this enabled a broad national scan, it precludes insight into the pedagogical reasoning and informal learning processes underpinning curriculum design. Further studies involving educators and students are needed to investigate how intended learning outcomes are implemented and experienced in practice.

Third, while the perspectives of industry stakeholders offered valuable insight into curriculum relevance and graduate preparedness, the study did not include direct input from consumers of paramedic services—such as patients, families, and the broader community. This omission limits understanding of how person-centred care is embedded in curriculum design. Given recent developments in paramedicine research and service delivery that emphasise consumer involvement (e.g. Simpson, 2023; Wilkinson-Stokes, 2022), future research should prioritise co-designed studies that centre community voices to ensure curricula are inclusive, responsive, and socially accountable.

Lastly, the study lacks empirical or longitudinal validation. Future research could address this by tracking how curricula shape paramedic capabilities over time, including through cross-institutional studies and stakeholder feedback.

By addressing these limitations, future work can help ensure paramedicine education aligns with the evolving expectations of health systems, industry, and the communities they serve.

Chapter 11: Conclusions

The transition from professional competency standards to capability-based accreditation standards by the Paramedicine Board of Australia highlights the ongoing need for clear curriculum guidance that reflects both the current and evolving scopes of practice in paramedicine..

This thesis's research and new knowledge make a valuable contribution to paramedicine education and practice. By introducing a paramedicine educational framework tailored to the evolving needs of paramedics, this study aims to support the advancement of educational models and provide a foundation that may assist in enhancing healthcare delivery within ambulance services..

This thesis contributes new knowledge that advances paramedicine education and practice. By proposing a paramedicine educational framework that is responsive to the evolving needs of the profession, the study offers a model that has the potential to support improvements in education, clinical standards, and alignment with broader healthcare priorities. While ambitious in scope, the intention is not to suggest immediate transformation of healthcare delivery, but rather to provide a foundation that may inform and influence future developments within paramedicine, including within ambulance services.

Recognising the dynamic nature of paramedic practice, the thesis emphasises the importance of an adaptable educational curriculum that equips students with the requisite skills, knowledge, and competencies to excel in their roles. This research addresses the burgeoning demands of Australia's paramedic profession by implementing the Paramedicine Healthcare Framework (Educational Framework), explicitly tailored for tertiary education.

This innovative approach enhances the quality of paramedic education, ensuring that graduates are well-prepared to navigate the complexities of modern healthcare delivery. By bridging the gap between theory and practice, the thesis contributes to the advancement of paramedicine and serves as a model for future research and curriculum development in the field.

The previous chapter presented an accreditation framework that guides curriculum development, aligning with academics' beliefs and curricula concepts and serves the changing scope of practice in paramedicine during a time of health reform. The framework combines an understanding of the HE curriculum and curriculum development processes with empirical evidence of curriculum perceptions among paramedic academics. The framework accommodates the academic's understanding of the curriculum, experience, and expertise in paramedicine, as well as their perspective on the future direction of paramedicine. Such a framework reflects what the University staff envision as an ideal model for developing curricula and the evolving scope of practice for paramedics.

While the framework prioritises the insights and expertise of paramedic academics, it is equally important to recognise the value of incorporating diverse stakeholder voices beyond the academic community. In particular, the perspectives of consumers and members of the public, who ultimately provide consent through funding and support for paramedic services, should be actively integrated into curriculum development and professional standards. Additionally, other paramedic/EMS groups not regulated by the PBA, can offer valuable input to ensure the framework remains responsive to evolving societal needs and expectations. Future iterations of the framework should, therefore, include structured mechanisms for engaging these broader voices to promote a more inclusive and holistic approach to shaping paramedicine education and practice.

Adopting this Paramedicine Healthcare Framework has the potential to make a meaningful contribution to the ongoing development of curriculum and the professionalism of paramedicine..

Continuously evaluating existing and emerging curricula is essential to ensure that paramedics are best prepared to provide a high-quality response. Limited research has been conducted on curriculum development, with no one study evaluating multiple curricula or accreditation frameworks that support curriculum development. This thesis presents a pioneering contribution to the field of paramedicine, introducing a framework tailored to meet the evolving demands of the profession. Recognising the imperative for a dynamic educational curriculum, the study emphasises the need to equip students with the essential skills, knowledge, and competencies required for contemporary paramedic practice. With the implementation of the Paramedicine

Healthcare Framework in tertiary education, this research ensures that future paramedics are not only well-prepared but also poised to excel in navigating the intricacies of modern healthcare delivery, thus propelling the field of paramedicine to new heights of excellence.

The undertaking of this study is due to the changing context of paramedicine in Australia. The changes in regulation, professionalism, standardised care, and scopes of practice may well influence the standards of education expected of paramedics in the future. Adopting the Paramedicine Healthcare Framework developed in this research will dramatically elevate the standards of paramedic education in several ways. Firstly, by tailoring the educational approach to the specific needs and challenges of modern paramedicine, students will receive a more relevant and comprehensive training experience. This targeted pedagogy will ensure that graduates possess the foundational knowledge and critical thinking skills necessary to excel in a rapidly evolving healthcare landscape.

The Paramedicine Healthcare Framework represents a critical advancement in aligning paramedic education with evolving professional standards and healthcare demands. It provides a structured framework for curriculum development, ensuring consistency in graduate competencies while addressing gaps in primary healthcare, leadership, and the integration of technology.

The rationale for the Paramedicine Healthcare Framework stems from the increasing complexity of paramedic roles and the need for standardised educational outcomes. As paramedicine evolves, with expanding scopes of practice in community and primary healthcare, a unified framework is essential to maintain high standards across educational institutions. The Paramedicine Healthcare Framework aligns closely with the professional capabilities defined by the Paramedicine Board of Australia (PBA).

Moreover, the Paramedicine Healthcare Framework emphasises practical, hands-on learning experiences and authentic assessment methods. This shift from traditional rote memorisation towards experiential learning will better prepare paramedic students for real-world scenarios, fostering confidence and competence in their clinical practice.

Furthermore, incorporating critical theory into the curriculum encourages a deeper understanding of healthcare's societal and ethical dimensions. By equipping students with the tools to critically analyse and challenge existing norms and practices, the pedagogy promotes a culture of continuous improvement and innovation within the profession.

Implementation and Future Directions

Implementing the Paramedicine Healthcare Framework requires collaboration between educational institutions, regulatory bodies, and industry stakeholders. This ensures that curricula reflect emerging trends, such as telehealth, digital literacy, and interprofessional collaboration. By embedding Paramedicine Healthcare Framework principles into accreditation standards, institutions can drive consistency in paramedicine education nationwide.

The successful adoption of the Paramedicine Healthcare Framework relies on a coordinated and collaborative approach involving key stakeholders across education, regulation, and industry. The implementation plan consists of the following key components:

1. Stakeholder Collaboration: Establish formal partnerships between educational institutions, regulatory bodies such as the Paramedicine Board of Australia, professional associations, and industry representatives to guide and support framework adoption.
2. Curriculum Integration: Encourage institutions to align their paramedicine curricula with the framework's principles, ensuring emerging trends—such as telehealth, digital literacy, and interprofessional collaboration—are embedded in course content and delivery.
3. Accreditation Alignment: Work with accreditation authorities to incorporate the framework's standards into accreditation criteria, promoting consistency and quality across paramedicine education programs nationwide.
4. Ongoing Review and Feedback: Implement mechanisms for continuous evaluation and feedback from educators, students, practitioners, and consumers to refine the framework and its application over time.

By focusing on these interconnected steps, the implementation plan aims to support a phased, sustainable integration of the Paramedicine Healthcare Framework, fostering progressive improvements in education and professional practice.

Professional development programs for educators and resource-sharing initiatives to support curriculum design will be crucial in facilitating widespread adoption. Furthermore, continuous evaluation and refinement of the Paramedicine Healthcare Framework will ensure it remains responsive to the evolving healthcare landscape.

Due to the evolution of paramedic clinical care, there is a need to stay up to date with changing medical practices, particularly in prehospital care (Corcoran et al., 2016; Kim et al., 2020). Paramedics typically operate in uncontrolled settings, yet diagnostic assessments and management practices are progressing with increasing sophistication (Jensen et al., 2009; Peate, 2015; Heaney, 2020). The changes in paramedics' scope of practice and the implementation of new skills and diagnostic equipment are significant in the paradigm of paramedics' education. Additionally, the community is assured that the care provided by graduate paramedics is of a high standard (Council of Ambulance Authorities Inc., 2016). Considering the importance of paramedic education leading to improved professionalism, changing scope of practice, and autonomous practitioners with a depth of knowledge, it is not surprising that a specific accreditation framework for developing a curriculum needs to be well-researched.

While education curricula cannot hope to keep pace with every change in practice (hence the discussion on time lag previously), the adoption of the Paramedicine Healthcare Framework developed in this research will ensure that future paramedics are critical thinkers with the skills, knowledge, and competencies to adapt to an ever-evolving environment and community needs.

The Paramedicine Healthcare Framework proposed by this research may be ambitious for paramedicine and any discipline. It has been developed using best practice research methodology that could be adapted for any discipline. It is also primarily aimed at the national accreditation scheme rather than higher education institutions. However, with amendments, it is highly relevant and adaptable to make it helpful in teaching paramedicine across different higher education institutions.

The Paramedicine Healthcare Framework aimed to provide a potential roadmap for accreditation of paramedicine programs that may need the evolving scope of practice within the primary healthcare model within their curriculum. It provides a robust and quality-focussed framework that considers all elements of accreditation to provide a foundation for the accreditation of paramedicine programs. It draws on the professional capabilities currently in place by the PBA, the literature on accreditation and scopes of practice, and the Paramedicine Healthcare Framework three-tiered model.

The research in this thesis included an extensive examination of the paramedicine literature and an intensive interpretation and analysis of primary data. Undertaking any research, mainly a PhD, is to launch a deep dive into the literature in the study area and be able to interpret and analyse the data. Despite having some experience with the CAA accreditation body as well as accreditation bodies in different areas of the health professions, it became apparent that this was a limited field of research, and to understand the context, it was essential to look at the background of accreditation, paramedicine evolving scopes of practice and how they interact with each other.

Accreditation within higher education has had a much longer and more interesting history than paramedicine's national accreditation scheme, stretching back many decades. In higher education, the aims have mostly stayed the same over time, with quality as one of the key components. Quality of care has also become part of paramedic practice; however, as most people who will read this thesis do not work directly in the area, more than a passing knowledge of this was needed for this study. Researching how paramedicine's scope of practice is developed and how important it is to society highlights how crucial it is to understand the concepts of quality and to apply them correctly and appropriately through the accreditation of paramedic programs.

Addressing Gaps and Enhancing Educational Outcomes

The Paramedicine Healthcare Framework addresses inconsistencies identified in current paramedicine programs, bridging the divide between emergency-focused curricula and the broader competencies required for modern paramedic practice. By integrating areas such as primary healthcare, leadership, and research, the framework enhances graduate readiness and promotes excellence in patient care.

Strengthening the role of professionalism and patient-centred care within the framework ensures that graduates are equipped with the technical skills, critical thinking, and ethical judgment necessary to navigate complex clinical environments. This holistic approach positions paramedics as key contributors to the healthcare workforce, capable of addressing acute and chronic healthcare challenges.

In conclusion, the Paramedicine Healthcare Framework provides a comprehensive, adaptable framework that enhances paramedic education and aligns with national and international best practices. By fostering collaboration and continuous improvement, the Paramedicine Healthcare Framework will be pivotal in shaping the future of paramedicine education and practice in Australia.

11.1 FUTURE DIRECTIONS

Future research on the Paramedicine Healthcare Framework should focus on expanding the framework to address emerging areas in paramedicine, such as mental health, telehealth, and community paramedicine. As the scope of paramedic practice continues to evolve, it is essential to ensure that the Paramedicine Healthcare Framework remains adaptive and reflective of the profession's diverse and dynamic needs. Collaborative research involving universities, healthcare organisations, and regulatory bodies can provide insights into how paramedic roles change in response to technological advancements and societal healthcare demands.

It should also be acknowledged that the PBA is currently examining scopes of practice and specialist roles within paramedicine; however, in 2025 at the time of writing the thesis, this process remains in a consultation phase. Continued engagement with regulatory developments will be important to ensure the framework aligns with future professional standards and regulatory requirements.

Moreover, expanding the Paramedicine Healthcare Framework to include postgraduate education and specialised training pathways can enhance career development opportunities for paramedics. This could facilitate the creation of advanced practice roles and leadership positions, contributing to workforce sustainability and improved patient outcomes. Future iterations of the Paramedicine Healthcare Framework should also explore how global paramedicine trends can inform domestic educational strategies, fostering international collaboration and knowledge exchange.

Investing in longitudinal studies to track the impact of Paramedicine Healthcare Framework implementation on graduate competencies and patient care outcomes will be invaluable. Such research will validate the framework's effectiveness and highlight areas for refinement, ensuring that paramedicine education continues to meet the highest standards of excellence.

There are multiple health disciplines outside of paramedicine for which this research could be used. It can guide disciplines seeking to implement accreditation or for current accreditation organisations to review if they have a framework. This work has demonstrated that it is possible to develop a framework despite the differences in consensus reached by paramedic academics compared to the literature around scopes of practice. The next, and perhaps more challenging, step is to implement the framework nationally.

Implementation science relates to real-world situations where findings from the research are implemented into practice to improve quality and outcomes, focusing on patients, providers, organisations, and policies related to healthcare (Wensing, 2015). This is relevant to this thesis, given that the work examined the accreditation of paramedicine programs and produced findings that could be applied beyond the boundaries of paramedicine. Although the details of the Paramedicine Healthcare Framework refer to the accreditation of paramedicine programs, the overall Paramedicine Healthcare Framework model is highly suitable and applicable to the accreditation of any other professions outside of healthcare. To achieve support, applying the accreditation framework both nationally and internationally requires an implementation strategy, developing relationships, and engaging stakeholders (Wensing, 2015).

This research aimed to explore the current and evolving scope of practice of paramedics, identify what specific role the NRAS plays in paramedicine's evolving scope of practice, and determine if the current curriculum guidance by the NRAS is based on evidence and expert consensus. The thesis identified an evolving scope of practice nationally and internationally, and despite accreditation, current paramedic curricula still need to support the evolving scope of practice. This thesis demonstrates how an accreditation framework was developed and situates the framework within the context of accrediting paramedicine programs.

11.2 RECOMMENDATIONS

The following recommendations are intended to emphasise that the proposed Paramedicine Healthcare Framework is designed to incorporate and support the implementation of the five preceding recommendations, providing a cohesive and practical structure for advancing paramedicine education and practice.

1. Support for Evolving Scope of Practice: Advocate for ongoing support and adaptation of paramedic curricula to align with the evolving scope of practice. This may involve regular reviews of curriculum guidance by relevant organisations such as the NRAS to ensure it remains evidence-based and reflective of expert consensus.
2. Future research should consider broadening the involvement of stakeholders beyond those traditionally consulted in paramedicine-related studies. Greater inclusion of diverse voices—such as patients, community representatives, non-JAS paramedics, policymakers, and educators—could enhance the depth and applicability of findings. This would also contribute to more robust consultation and collaboration processes, which were largely beyond the scope of the present study.
3. A recommendation for future research is to conduct a follow-up study that centres the perspectives of service users in the co-design of paramedicine education, ensuring that curricula remain responsive, inclusive, and socially accountable.
4. Paramedicine Healthcare Framework: Highlight the suitability of the Paramedicine Healthcare Framework model used in the research for the field of paramedicine. This could spark discussions and initiatives to apply similar pedagogical approaches in accreditation processes across various disciplines.

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Appendices

Appendix A

RESEARCH PORTFOLIO

This thesis includes six papers published in peer-reviewed journals. Its core theme is undergraduate paramedicine curriculum design in the context of the national accreditation scheme. The ideas, development and writing of all the papers in the thesis were the principal responsibility of myself, the candidate, working within the Faculty of Health Sciences under the supervision of Professor Scott Devenish and Associate Professor Louisa Lam. One paper was published with my previous supervisors at CQUniversity, Associate Professor Celeste Lawson and Professor Brett Williams.

Thesis Chapter	Publication title	Publication status	Extent of candidate contribution	Authors signatures
2	A comparative analysis of vocational and university paramedicine education: Implications for professionalism	Weber, A., Devenish, S., & Lam, L. (2024). Vocational and University Paramedicine Education. International Journal of Paramedicine, 7, 163–171. https://doi.org/10.56068/intx9615 Published July 8, 2024. All of the articles published in IJOP are open source under the Creative Common licensure.	Anthony Weber 90% - Concept development, key ideas, development and writing up Scott Devenish 5% - Reviewing and Editing Louisa Lam 5% Reviewing and Editing	

5	An Anglosphere comparison of paramedicine regulatory frameworks and the influence on curricula: A descriptive comparative review	Weber, A., Devenish, S., & Lam, L. (2024a). An Anglosphere comparison of paramedicine regulatory frameworks and the influence on curricula: A descriptive comparative review. Paramedicine, 21(5). https://doi.org/10.1177/27536386241249177 Published 8 April 2024 This article is distributed under the terms of the Creative Commons Attribution-Non Commercial 4.0 License (https://creativecommons.org/licenses/by-nc/4.0/) which permits non-commercial use, reproduction and distribution of the work without further permission provided the original work is attributed as specified on the SAGE and Open Access page (https://us.sagepub.com/en-us/nam/open-access-at-sage).	Anthony Weber 80% - Concept development, key ideas, development and writing up Scott Devenish 10% - Reviewing and Editing Louisa Lam 10% Reviewing and Editing	[redacted]
6	Exploring the alignment between paramedicine's professional capabilities and competency frameworks for current and evolving scopes of practice: a literature review.	Weber, A., Devenish, S., & Lam, L. (2024b). Exploring the Alignment between paramedicine's Professional Capabilities and Competency Frameworks for Current and Evolving Scopes of practice: a Literature Review. BMC Medical Education, 24(1). https://doi.org/10.1186/s12909-023-04992-w Published January 2024 This article is licensed under a Creative Commons Attribution 4.0 International License, which permits use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the	Anthony Weber 90% - Concept development, key ideas, development and writing up Scott Devenish 5% - Reviewing and Editing Louisa Lam 5% Reviewing and Editing	[redacted]

		Creative Commons licence, and indicate if changes were made.		
7	Exploring Paramedicine Models of Care: A Novel Macro Analysis Using the RESPIGHT Framework	Weber, A., Devenish, S. & Lam, L. Exploring Paramedicine Models of Care: A Novel Macro Analysis Using the RESPIGHT Framework. Australian Journal of Rural Health, February 2025; 33(1). https://doi.org/10.1111/ajr.13215 Published February 2025 Reuse of your own article in a new publication of which you are the author, editor or co-editor, prior permission is not required.	Anthony Weber 90% - Concept development, key ideas, development and writing up Scott Devenish 5% - Reviewing and Editing Louisa Lam 5% Reviewing and Editing	[redacted]
8	Mapping the Evolution of Paramedicine Education: Insights, Trends, and Recommendations for Primary Healthcare Preparedness.	Weber, A., Devenish, S., & Lam, L. (2025). Mapping the evolution of paramedicine education: Insights, trends, and recommendations for primary healthcare preparedness. International Journal of Paramedicine. (10), 9-25. https://doi.org/10.56068/TYVD4073 . Retrieved from https://internationaljournalofparamedicine.com/index.php/ijop/article/view/3191 All of the articles published in IJOP are open source under the Creative Common licensure.	Anthony Weber 90% - Concept development, key ideas, development and writing up Scott Devenish 5% - Reviewing and Editing	[redacted]

			Louisa Lam 5% Reviewing and Editing	[redacted]
9	Frameworks that guide curriculum development in Australian higher education.	Weber, A., Lawson, C., & Williams, B. (2021). Frameworks that guide curriculum development in Australian higher education. Journal of Paramedic Practice, 13(3), 105–112. https://doi.org/10.12968/jpar.2021.13.3.105 Published 10 March 2021. All of the articles published in JPP are open source under the Creative Common licensure.	Anthony Weber 70% - Concept development, key ideas, development and writing up Celeste Lawson 20% - Review and Editing Brett Williams 10% - Reviewing	[redacted] Deceased [redacted]

Refereed Conference Presentations

Conference title	Conference
Paramedicine as a profession: Proposition of a Signature Pedagogy.	College of Paramedics International Education Conference, 17th April, 2021, United Kingdom (Virtual Conference). Paramedic Education Policy Session.
Paramedic Higher Education: Findings of a Comparative Review.	College of Paramedics International Education Conference, 17th April, 2021, United Kingdom (Virtual Conference). Paramedic Education Policy Session
A framework for consistent curriculum design in paramedicine higher education: a systematic review.	Strengthening research through collaboration Symposium, 25-26 October 2019, Frankston, Victoria. Session 6: Enhancing Paramedic Education.
Paramedic education: a systematic review of best practice paramedic curriculum in Australia and New Zealand.	Australian & New Zealand Association for Health Professional Educators (ANZAHPE) 2018 Conference. Hobart- 2018.

Appendix B

ETHICS APPROVAL

CELEBRATING
25 YEARS

Secretary, Human Research Ethics Committee
Ph: 07 4923 2603
Fax: 07 4923 2600
Email: ethics@cqu.edu.au

Prof Brian Maguire
A/Prof Anthony Weber
School of Health, Medical and Applied Sciences
CQUniversity

11 September 2017

Dear Prof Maguire and A/Prof Weber

HUMAN RESEARCH ETHICS COMMITTEE ETHICAL APPROVAL PROJECT: H17/07-142 CONSENSUS AMONGST PARAMEDIC ACADEMICS ON CURRICULUM DESIGN THAT WOULD ENHANCE STUDENTS' ATTRIBUTES AND CAPABILITIES TO BECOME INDEPENDENT, COMPETENT PRACTITIONERS

The Human Research Ethics Committee is an approved institutional ethics committee constituted in accord with guidelines formulated by the National Health and Medical Research Council (NHMRC) and governed by policies and procedures consistent with principles as contained in publications such as the joint Universities Australia and NHMRC *Australian Code for the Responsible Conduct of Research*. This is available at http://www.nhmrc.gov.au/publications/synopses/_files/r39.pdf.

On 8 September 2017, the Chair of the Human Research Ethics Committee considered your application under the Low Risk Review Process. This letter confirms that your project has been granted approval under this process, pending ratification by the full committee at its September 2017 meeting.

The period of ethics approval will be from 8 September 2017 to 31 March 2018. The approval number is H17/07-142; please quote this number in all dealings with the Committee. HREC wishes you well with the undertaking of the project and looks forward to receiving the final report.

The standard conditions of approval for this research project are that:

(a) you conduct the research project strictly in accordance with the proposal submitted and granted ethics approval, including any amendments required to be made to the proposal by the Human Research Ethics Committee;

(b) you advise the Human Research Ethics Committee (email ethics@cqu.edu.au) immediately if any complaints are made, or expressions of concern are raised, or any other issue in relation to the project which may warrant review of ethics approval of the project. *(A written report detailing the adverse occurrence or unforeseen event must be submitted to the Committee Chair within one working day after the event.)*

(c) you make submission to the Human Research Ethics Committee for approval of any proposed variations or modifications to the approved project before making any such changes;

(d) you provide the Human Research Ethics Committee with a written "Annual Report" on each anniversary date of approval (for projects of greater than 12 months) and "Final Report" by no later than one (1) month after the approval expiry date; *(Forms may be downloaded from the Office of Research Moodle site - http://moodle.cqu.edu.au/mod/book/view.php?id=334905&chapterid=17791.)*

(e) you accept that the Human Research Ethics Committee reserves the right to conduct scheduled or random inspections to confirm that the project is being conducted in accordance to its approval. Inspections may include asking questions of the research team, inspecting all consent documents and records and being guided through any physical experiments associated with the project

(f) if the research project is discontinued, you advise the Committee in writing within five (5) working days of the discontinuation;

(g) A copy of the Statement of Findings is provided to the Human Research Ethics Committee when it is forwarded to participants.

Please note that failure to comply with the conditions of approval and the *National Statement on Ethical Conduct in Human Research* may result in withdrawal of approval for the project.

You are required to advise the Secretary in writing within five (5) working days if this project does not proceed for any reason. In the event that you require an extension of ethics approval for this project, please make written application in advance of the end-date of this approval. The research cannot continue beyond the end date of approval unless the Committee has granted an extension of ethics approval. Extensions of approval cannot be granted retrospectively. Should you need an extension but not apply for this before the end-date of the approval then a full new application for approval must be submitted to the Secretary for the Committee to consider.

The Human Research Ethics Committee wishes to support researchers in achieving positive research outcomes. If you have issues where the Human Research Ethics Committee may be of assistance or have any queries in relation to this approval please do not hesitate to contact the Secretary, Sue Evans or myself.

Yours sincerely,

A/Prof Tania Signal
Chair, Human Research Ethics Committee

Cc: Dr Celeste Lawson Project file

Approved

Appendix C

EMAIL INFORMATION TO PARTICIPANTS

Dear Fellow Paramedic Academic:

As part of my PhD studies, I am investigating the curriculum and design of Bachelor of Paramedic Science (BPSc) or equivalent degree programs. Specifically I am interested in learning about what paramedic academics believe are the best curriculum components that help provide graduates with the skills, theory and knowledge to be job capable and prepared for rapid changes in practice.

To participate in this project all you need to do is take approximately 120 minutes in total to complete three stages of an online questionnaire, please visit the following URL to complete this questionnaire:

https://www.surveymonkey.com/r/T6GZQ8Q

Your participation in this research is voluntary. All information you provide will remain confidential and be used only for this research. Once the questionnaire is returned, withdrawal of data from the study will not be possible as all questionnaires will be de-identified.

Attached to this email is the Participant information sheet and instruction sheet. These documents contains information about the study and how the Delphi study will be undertaken. If you agree to participate, please sign the information sheet and complete the survey.

Thank you in advance for assisting with and taking the time to participate in this study.

Anthony Weber

PhD student

CQUniversity.

Appendix D

PARTICIPANT RESEARCH INFORMATION SHEET

Research Title: Consensus amongst paramedic academics on curriculum design that would enhance students' attributes and capabilities to become independent, competent practitioners.

Principle Researcher: Anthony Weber

Research Supervisors: Professor Brian Maguire

Dr Celeste Lawson

Dear Fellow Paramedic Academic:

As part of my PhD studies, I am investigating the curriculum and design of Bachelor of Paramedic Science (BPSc) or equivalent degree programs. Specifically I am interested in learning about what paramedic academics believe are the best curriculum components that help provide graduates with the skills, theory and knowledge to be job capable and prepared for rapid changes in practice.

If you agree to participate, please read and sign the attached information sheet, and complete the attached survey *Consensus amongst paramedic academics on curriculum design that would enhance students' attributes and capabilities to become independent, competent practitioners*. This survey will take approximately 40 minutes in total to complete. All of your answers will be kept completely confidential. The study results will not contain any identifying information and no individual identities will be used in any reports or publications that may result from this study.

The survey involves three rounds to determine consensus from paramedic academics to determine a learning and teaching curriculum framework across higher education institutions that prepares paramedic students to become job capable as well as being

flexible allowing for regular curriculum updates that reflects the progression of the role of a paramedic.

Thank you in advance for assisting with and taking the time to participate in this study.

Sincerely,

Anthony Weber

PhD Candidate

Benefits and Risks

This research will explore paramedic academic consensus of curriculum design elements that can contribute to best practice frameworks to ensure higher education institutions are providing qualifications that not only prepares students for employment as competent, independent and safe practitioners, but are adaptable to the changing practices of paramedics. This information developed through this process may help guide the development and implementation of future paramedic education.

Will I be informed of the results of the research?

Yes, the results of this research will be made available in the form of a plain English report. Deidentified research findings based on the data collected will be published in a thesis, journal articles and conference proceedings.

What will be required of me?

To participate in this project all you need to do is take approximately 40 minutes in total to complete three stages of an online questionnaire, please visit the following URL to complete this questionnaire:

https://www.surveymonkey.com/r/T6GZQ8Q

Your participation in this research is voluntary. All information you provide will remain confidential and be used only for this research. Once the questionnaire is returned, withdrawal of data from the study will not be possible as all questionnaires will be de-identified.

What will be done to make sure the information is confidential?

There are a number of ways that we can assure you that your confidentiality will be preserved in this project. Administrative access of creating/editing survey questions, is limited to those researchers involved with the project, however once the survey is

created and published you can just access the link by going to that site and completing the survey. The program will collect the anonymous data for the researchers to access for results. Only myself and my two supervisors will have access to information that you provide. All completed questionnaires will be stored in a secure area for a period of five years and then destroyed in accordance with University Human Research Ethics Committee policy.

Who do I talk to if I have concerns about the project?

Please contact Central Queensland University's Office of Research (Telephone: 07 4923 2603, or Email ethics@cqu.edu.au) you have any concerns about the nature and/or conduct of this research project.

What am I consenting to?

In completing the questionnaire, I understand that I consent to participate in this research project and agree that:

I have read and understood this information sheet

I can have any questions answered to my satisfaction

I understand that my participation is completely voluntary and that is my right to choose to participate or not.

I understand that once I have completed and saved the questionnaire I will not be able to withdraw my data.

I understand the research findings will be presented as conference presentations, journal articles and as part of a PhD Thesis.

I understand that my participation is confidential.

Signature_____

Again, thank you for taking the time to read this information sheet and, if you so choose, for participating in the research. Please feel free to contact me should you have any questions about the research.

Anthony Weber

49232276

a.weber2@cqu.edu.au

Appendix E

PARTICIPANT INSTRUCTION SHEET

Research Title: Consensus amongst paramedic academics on curriculum design that would enhance students' attributes and capabilities to become independent, competent practitioners.

Principle Researcher: Anthony Weber

Thank you for participating in this study to examine components of a learning and teaching curriculum frameworks across higher education institutions that: best prepares paramedic students to become job capable; as well as, being flexible and allowing for regular curriculum updates that reflects the progression of the role of a paramedic. This study is seeking your expert opinion on the curriculum components (subjects/units/topics) that provide graduates with the skills, theory and knowledge to be job capable and prepared for rapid changes in practice.

There are three rounds of surveys for this study. Each survey will take 40 minutes to complete.

Round one

In Round one, you will be asked to list all the subjects, units or topics that you feel best prepares students for employment as competent, independent and safe practitioners, whilst being adaptable to the changing practices of paramedics. This will be a free text survey, where you can use any words you like to describe the subject, units or topics. There are no pre-conceived areas of study that are required to be included.

This round will be open for 14 days. After this round closes, the responses will be categorised and listed as curriculum components. Then, in Round two, you will score each component on a Likert scale of its relative importance to curriculum best practice.

Round two

The responses about specific curriculum components nominated in Round one will be categorised. Categories will be determined based on an analysis of all responses. There are no pre-conceived curriculum components.

In Round two, you will be provided a survey where you can score each component (determined through Round one) on a Likert scale in terms of importance. Importance is defined as the best curriculum component that provides graduates with the skills, theory and knowledge to be job capable and prepare for rapid changes in practice.

The purpose of Round two is to achieve expert consensus on the aspects of curriculum design that most contribute to enhance students' attributes and capabilities to become independent, competent practitioners.

The Likert scale is as follows:

1: no importance at all, very unlikely to provide graduates with the skills, theory and knowledge to be job capable and prepare for rapid changes in practice.

2: not very important, unlikely to provide graduates with the skills, theory and knowledge to be job capable and prepare for rapid changes in practice.

3: possibly or sometimes important, it may provide graduates with the skills, theory and knowledge to be job capable and prepare for rapid changes in practice in certain circumstances.

4: important, in most instances it will provide graduates with the skills, theory and knowledge to be job capable and prepare for rapid changes in practice.

5: extremely important, very likely it will provide graduates with the skills, theory and knowledge to be job capable and prepare for rapid changes in practice.

This round will be open for 14 days. After the Round two survey is completed, responses will be ordered in terms of mean score. In Round three of the study, you will review the order of the components, and will be given the opportunity to change the score for each. Round three is designed to achieve consensus amongst the group.

Round three

In Round one, a list of important subjects/units/topics for paramedic students were categorised into curriculum components. In Round two, these components were scored on a Likert scale against their relative importance to curriculum best practice.

In Round three, you will review the list of curriculum components, including the scores from round two, and the group mean scores. If you wish, you can change your score for any curriculum component in this round. You will also have the opportunity to submit new components or make any comments you feel are relevant to the study.

Thank you for taking the time to read this information sheet and, if you so choose, for participating in the research. Please feel free to contact me should you have any questions about the research.

Anthony Weber

49232276

a.weber2@cqu.edu.au

Appendix F

CURRICULUM SUBJECTS IDENTIFIED AFTER ROUND ONE

Category	Component
Physical Sciences	Introduction bioscience Biochemistry Chemistry Foundation of Basic Sciences Pharmacology
Life Sciences	Anatomy and Physiology Pathophysiology Medical Physiology Pathophysiology of Issues in Primary Care Microbiology and infection prevention
Social, Health and Behavioural Science	Maternal and child health Pathways of Care In Healthcare Marginalised Groups in Society Psychology Drugs of Abuse Chronic disease management Mental health care of patients Trends in epidemiology Special populations including care of patients with disabilities Health models and role of paramedicine Alternate care pathways Minor Injuries and Minor Illnesses (MIAMI) Remote and Extended Care
Clinical science	Basic Lab Values Interpretation in Emergency Medicine and Family Medicine: blood values, imaging, POCUS, ECGs Clinical Assessment (data interpretation) ECG interpretation Advanced electrophysiology and ECG interpretation
Ethics and Law	Law and Ethics Understanding Decision Making Cultural Considerations Legal premise for paramedic practice Ethical considerations in practice Resolving personal, ethical and legal dilemma
Patient Assessment	Patient Assessment (assessing the patient, not the machine) Acute Medical emergency assessment and treatment Trauma, Environmental emergency and envenomation assessment and treatment Consolidated Paramedic Practice (capstone)

	Medical diagnoses and the complex diagnostic Assessment Paediatric emergency care assessment Common Issues of Growth/ Lifespan issues
Care delivery	Acute Medical emergency treatment Applied pharmacology in paramedic practice Scene Control Manual Handling Clinical Placement/WIL Self Defence Practical skills Basic life support: Includes CPR with AED, basic first aid management, Haemorrhage control and basic systematic approach Manual handling Paediatric emergency management Treatment Modalities in Emergency Medicine
Leadership Attributes	Human Factors: team work Clinical leadership Clinical education Praxis including reflective learning models Mentoring
Evidence-and-research based practice	Research training/Fundamentals of research Evidence based practice Research project
Foundation paramedic practice	Introducing the profession Communications Foundations of Paramedic Clinical Practice Medical Terminology, documentation and basic ambulance systems Clinical communication skills Professional practice
Self-care in the EMS setting	Paramedic Practitioner Health (Diet, Exercise, Sleep, Injuries) Stress and Distress: what it is, how it affects us Occupational Health and Safety

Appendix G

SCORES FROM DELPHI METHOD – ROUNDS TWO AND THREE

Category	n	Consensus (n) % Likert score 1	consensus (n) % Likert score 2	consensus (n) % Likert score 3	consensus (n) % Likert score 4	consensus (n)% Likert score 5	Mean score for category
Physical Sciences							
Introduction bioscience	68	(2)2.94%	(4) 5.88%	(14)20.59%	(36)17.65%	(12)17.65%	3.76
Biochemistry		(0)0.00%	(8)11.76%	(16)23.53%	(34)50.00%	(10)14.71%	3.68
Chemistry		(0)0.00%	(10)14.71%	(30)44.12%	(18)26.47%	(10)14.71%	3.41
Foundation of Basic Sciences		(2)2.94%	(0)0.00%	(24)35.29%	(20)29.41%	(22)32.35%	3.88
Pharmacology		(0)0.00%	(0)0.00%	(0)0.00%	(16)23.53%	(52)76.47%	4.76
							3.89

Category	n	Consensus (n) % Likert score 1	consensus (n) % Likert score 2	consensus (n) % Likert score 3	consensus (n) % Likert score 4	consensus (n)% Likert score 5	Mean score for category
Life Science							
Anatomy and Physiology	68	(0)0.00%	(0)0.00%	(0)0.00%	(10)14.71%	(58) 85.29%	4.85
Pathophysiology		(0)0.00%	(0)0.00%	(2) 2.94%	(8) 11.76%	(58) 85.29%	4.82
Medical physiology		(0)0.00%	(0)0.00%	(2) 2.94%	(24) 35.29%	(42)61.76%	4.59
Pathophysiology of Issues in Primary Care		(0)0.00%	(0)0.00%	(4) 5.88%	(30) 44.12%	(34) 50.00%	4.44
Microbiology and Infection prevention		(0)0.00%	(2) 2.94%	(16)23.53%	(30) 44.12%	(20) 29.41%	4.00
							4.54

Category	n	Consensus (n) % Likert score 1	consensus (n) % Likert score 2	consensus (n) % Likert score 3	consensus (n) % Likert score 4	consensus (n)% Likert score 5	Mean score for category
Clinical Sciences							
Basic lab values	68	(0)0.00%	(4) 5.88%	(8)11.76%	(28)41.18%	(28)41.18%	4.18
Clinical assessment		(0)0.00%	(0)0.00%	(6)8.82%	(22)32.35%	(40)58.82%	4.50
ECG interpretation		(0)0.00%	(0)0.00%	(0)0.00%	(2)2.94%	(66)97.06%	4.97
Advanced electrophysiology and ECG interpretation		(0)0.00%	(0)0.00%	(4)5.88%	(44)61.76%	(22)32.35%	4.56
							4.55

Category	n	Consensus (n) % Likert score 1	consensus (n) % Likert score 2	consensus (n) % Likert score 3	consensus (n) % Likert score 4	consensus (n)% Likert score 5	Mean score for category
Social, health and behavioral science							
Maternal and child health	68	(0)0.00%	(2) 2.94%	(14)20.59%	(32)47.06%	(20)29.41%	4.03
Pathways of Care In Healthcare		(0)0.00%	(2) 2.94%	(18)26.47%	(30)44.12%	(18)26.47%	3.94
Marginalized Groups in Society		(0)0.00%	(10)14.71%	(24)35.29%	(30)44.12%	(4)5.88%	3.41
Psychology		(0)0.00%	(4)5.88%	(14)20.59%	(40)58.82%	(10)14.71%	3.82
Drugs of Abuse		(0)0.00%	(2)2.94%	(10)14.71%	(38)55.88%	(18)26.47%	4.06
Chronic disease management		(0)0.00%	(2)2.94%	(20)29.41%	(20)29.41%	(26)38,24%	4.03
Mental health care of patients		(0)0.00%	(0)0.00%	(10)15.15%	(30)45.45%	(26)39.39%	4.24
Trends in epidemiology		(0)0.00%	(6)8.82%	(32)47.06%	(24)35.29%	(6)8.82%	3.44
Public Health		(0)0.00%	(4)6.02%	(34)51.52%	(22)33.33%	(6)9.09%	3.45
Special populations including care of patients with disabilities		(0)0.00%	(6)8.82%	(12)17.65%	(36)52.94%	(14)20.59%	3.85
Health models and role of paramedicine		(0)0.00%	(2)2.94%	(6)8.82%	(36)52.94%	(24)35.29%	4.21
Alternate care pathways		(0)0.00%	(8)11.76%	(16)23.53%	(28)41.18%	(16)23.63%	3.76
Minor Injuries and Minor Illnesses (MIAMI)		(0)0.00%	(2)2.94%	(16)23.52%	(30)44.12%	(20)29.41%	4.00
Remote and Extended Care		(0)0.00%	(0)0.00%	(26)38,24%	(28)41.18%	(14)20.59%	3.82
							3.86

Category	n	Consensus (n) % Likert score 1	consensus (n) % Likert score 2	consensus (n) % Likert score 3	consensus (n) % Likert score 4	consensus (n)% Likert score 5	Mean score for category
Ethics and Law							
Law and Ethics	68	(0)0.00%	(0)0.00%	(8)11.76%	(36)52.94%	(24)35.29%	4.24
Understanding decision making		(0)0.00%	(0)0.00%	(2)2.94%	(34)50.00%	(32)47.06%	4.44
Cultural considerations		(0)0.00%	(4)5.88%	(26)38.24%	(32)47.06%	(6)8.82%	3.59
Legal premise for paramedic practice		(0)0.00%	(0)0.00%	(8)11.76%	(30)44.12%	(30)44.12%	4.32
Ethical considerations in practice		(0)0.00%	(2)2.94%	(8)11.76%	(26)38.24%	(32)47.06%	4.29
Resolving personal, ethical and legal dilemmas		(0)0.00%	(2)2.94%	(22)32.35%	(28)41.18%	(16)23.53%	3.85
							4.12

Category	n	Consensus (n) % Likert score 1	consensus (n) % Likert score 2	consensus (n) % Likert score 3	consensus (n) % Likert score 4	consensus (n)% Likert score 5	Mean score for category
Patient Assessment							
Patient assessment(assessing the patient not the machine)	68	(0)0.00%	(0)0.00%	(0)0.00%	(2)2.94%	(66)97.06%	4.97
Acute medical emergency assessment and treatment		(0)0.00%	(0)0.00%	(0)0.00%	(10)14.71%	(58)85.29%	4.85
Trauma, environment emergency, envenomation assessment and treatment		(0)0.00%	(0)0.00%	(0)0.00%	(18)26.47%	(50)73.53%	4.74
Consolidated paramedic practice (capstone)		(0)0.00%	(0)0.00%	(10)14.71%	(16)23.53%	(42)61.76%	4.47
Medical diagnosis and the complex diagnostic assessment		(0)0.00%	(0)0.00%	(4)5.88%	(14)29.41%	(40)58.82%	4.47
Paediatric emergency care and assessment		(0)0.00%	(2)2.94%	(22)32.35%	(14)20.59%	(50)73.53%	4.68
Common issues of growth/lifespan issues		(0)0.00%	(8)11.76%	(28)41.18%	(26)38.24%	(6)8.82%	3.44
							4.51

Category	n	Consensus (n) % Likert score 1	consensus (n) % Likert score 2	consensus (n) % Likert score 3	consensus (n) % Likert score 4	consensus (n)% Likert score 5	Mean score for category
Care delivery							
Applied pharmacology in paramedic practice	68	(0)0.00%	(0)0.00%	(2)2.94%	(20)29.41%	(46)67.65%	4.65
Scene control		(0)0.00%	(2)2.94%	(6)8.82%	(20)29.41%	(40)58.82%	4.84
Manual handling		(0)0.00%	(0)0.00%	(12)17.65%	(32)47.06%	(24)35.29%	4.18
Clinical placement/WIL		(0)0.00%	(2)2.94%	(8)11.76%	(18)26.47%	(40)58.82%	4.41
Self defence		(0)0.00%	(8)11.76%	(16)47.06%	(26)38.24%	(2)2.94%	3.32
Practical skills		(0)0.00%	(0)0.00%	(1)2.94%	(20)29.41%	(46)67.65%	4.66
Basic life support; includes CPR, AED, basic first-aid management, hemorrhage control, and basic systematic approach		(0)0.00%	(0)0.00%	(4)5.88%	(4)5.88%	(60)88.24%	4.82
Paediatric emergency management		(0)0.00%	(0)0.00%	(4)5.88%	(14)20.59%	(50)73.53%	4.68
Treatment modalities in emergency medicine		(0)0.00%	(0)0.00%	(10)14.71%	(36)52.94%	(22)32.35%	4.18
							4.42

Category	n	Consensus (n) % Likert score 1	consensus (n) % Likert score 2	consensus (n) % Likert score 3	consensus (n) % Likert score 4	consensus (n)% Likert score 5	Mean score for category
Leadership attributes							
Human factors: teamwork	68	(0)0.00%	(0)0.00%	(0)0.00%	(34)50.00%	(34)50.00%	4.50
Clinical leadership		(0)0.00%	(0)0.00%	(4)5.88%	(24)35.29%	(40)58.82%	4.53
Clinical education		(0)0.00%	(0)0.00%	(12)17.65%	(30)44.12%	(26)38.24%	4.21
Praxis including reflective learning models		(0)0.00%	(2)5.88%	(22)32.35%	(26)38.24%	(16)23.53%	3.79
Mentoring		(0)0.00%	(0)0.00%	(20)29.41%	(30)44.12%	(18)26.47%	3.97
							4.18

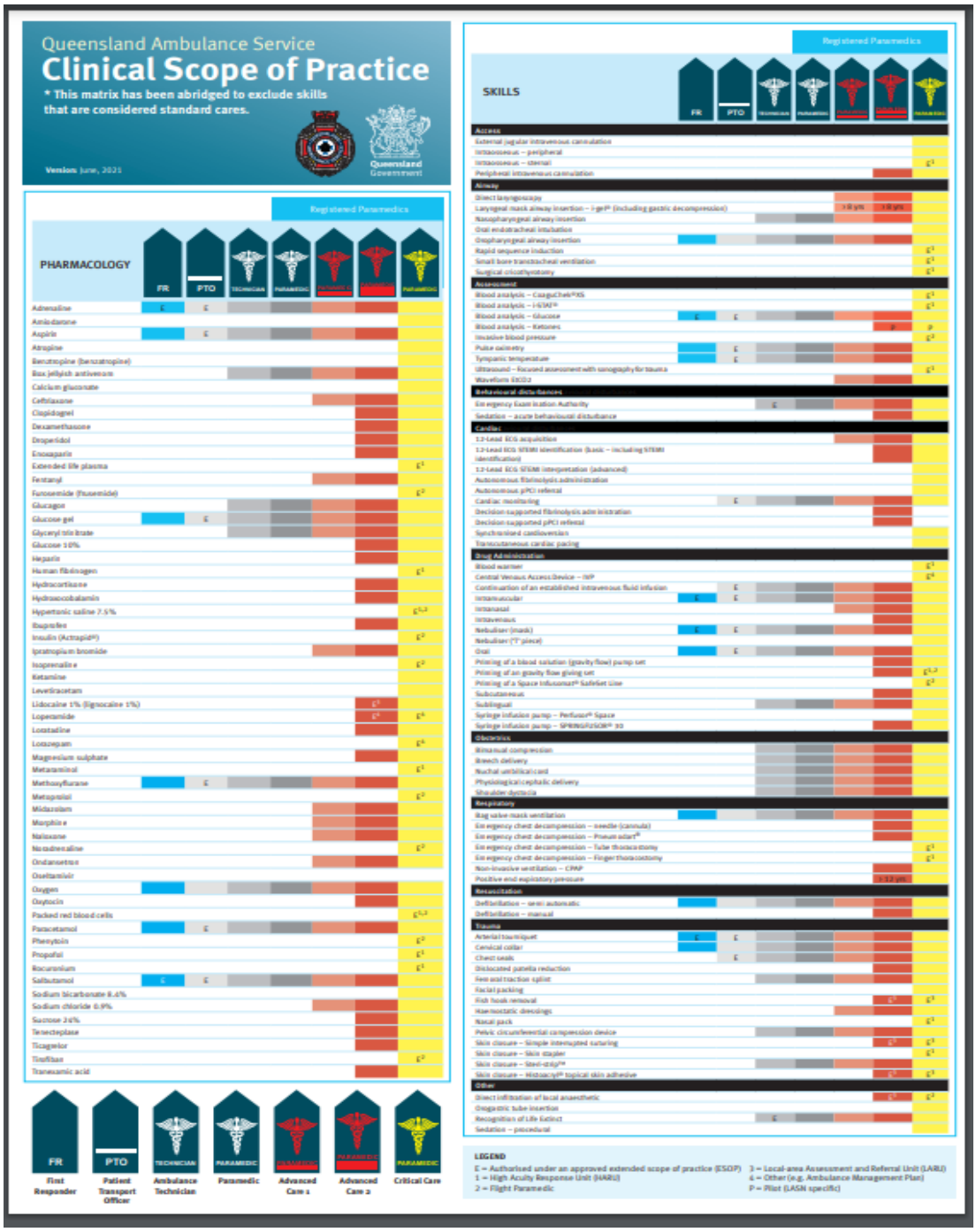
Category	n	Consensus (n) % Likert score 1	consensus (n) % Likert score 2	consensus (n) % Likert score 3	consensus (n) % Likert score 4	consensus (n)% Likert score 5	Mean score for category
Research							
Research training/fundamentals of research	68	(0)0.00%	(4)5.88%	(16)23.53%	(32)47.06%	(16)23.53%	3.88
Evidenced based practice		(0)0.00%	(2)2.94%	(2)2.94%	(46)67.65%	(18)26.47%	4.18
Research project		(4)5.88%	(6)8.82%	(18)26.47%	(26)38.24%	(14)20.59%	3.59
							3.88

Category	n	Consensus (n) % Likert score 1	consensus (n) % Likert score 2	consensus (n) % Likert score 3	consensus (n) % Likert score 4	consensus (n)% Likert score 5	Mean score for category
Foundation Paramedic practice							
Introducing the profession	68	(0)0.00%	(2)2.94%	(10)14.71%	(48)70.59%	(8)11.76%	3.91
Communications		(0)0.00%	(0)0.00%	(6)8.82%	(32)47.06%	(30)44.12%	4.35
Foundations of paramedic clinical practice		(0)0.00%	(0)0.00%	(6)8.82%	(32)47.06%	(30)44.12%	4.35
Medical terminology, documentation and basic ambulance systems		(0)0.00%	(0)0.00%	(4)5.88%	(38)55.88%	(26)38.24%	4.32
Clinical communication skills	66	(0)0.00%	(0)0.00%	(4)6.06%	(36)54.55%	(26)39.39%	4.33
Professional practice		(0)0.00%	(0)0.00%	(6)8.82%	(36)52.94%	(26)38.24%	4.29
							4.25

Category	n	Consensus (n) % Likert score 1	consensus (n) % Likert score 2	consensus (n) % Likert score 3	consensus (n) % Likert score 4	consensus (n)% Likert score 5	Mean score for category
No category							
Paramedic practitioner health (diet, exercise, sleep, injuries)	68	(0)0.00%	(0)0.00%	(12)17.65%	(36)52.94%	(20)29.41%	4.12
Stress and distress: what it is, how it affects us		(0)0.00%	(0)0.00%	(10)14.71%	(26)38.24%	(32)47.06%	4.32
Occupational Health and Safety		(0)0.00%	(0)0.00%	(18)26.47%	(30)44.12%	(20)29.41%	4.03
							4.15

Appendix H

EXAMPLE PARAMEDICINE'S SCOPE OF PRACTICE – QUEENSLAND AMBULANCE SERVICE (QAS)



Appendix I
COMPARISON OF EVOLVING SCOPE OF PRACTICE ROLES

Ref: (Pre-Hospital Emergency Care Council, 2022)

Jurisdiction	Enhanced physical examination and history	Phlebotomy	Arterial or venous blood gas sampling	Urinalysis	Peak flow	Spirometry	Wound care and wound closure	Local and regional anaesthesia	Urinary Catheterisation	Splinting and plastering	Dislocation assessment/management	Multiple system assessments including	Administer medications (beyond non specialist	Assisting hospital staff at particular times	Providing health cover	Chronic disease management	Health promotion activities	Health monitoring	Referrals to other specialties	Carry out and interpret diagnostic tests	Refer patients to social care services	Directly admit to specialist units	Investigate factors underlying the excessive	Interface with primary care	Palliative care management	Radiology Interpretation	Sonography	Otoscopy	Ear Nose and Throat (ENT) foreign body	Medication Prescribing
New South Wales- NSW Ambulance Service	✔ Yes	✖ No	✖ No	✔ Yes	✔ Yes	✔ Yes	✔ Yes	✔ Yes	✔ Yes	✔ Yes	✔ Yes	✔ Yes	✔ Yes	✖ No	✖ No	✖ No	✔ Yes	✖ No	✔ Yes	✔ Yes	✔ Yes	✖ No	✖ No	✔ Yes	✔ Yes	✖ No	✖ No	✔ Yes	✖ No	✖ No
Queensland - Queensland Ambulance Service	✔ Yes	✖ No	✖ No	✖ No	✖ No	✖ No	✔ Yes	✔ Yes	✖ No	✖ No	✔ Yes	✔ Yes	✖ No	✖ No	✖ No	✔ Yes	✖ No	✖ No	✔ Yes	✖ No	✔ Yes	✖ No	✖ No	✔ Yes	✖ No	✔ Yes	✖ No	✖ No	✖ No	✖ No
South Australia- Extended Care Program (ECP)	✔ Yes	✔ Yes	✔ Yes	✔ Yes	✔ Yes	✖ No	✔ Yes	✔ Yes	✔ Yes	✔ Yes	✔ Yes	✖ No	✔ Yes	✔ Yes	✔ Yes	✔ Yes	✔ Yes	✖ No	✔ Yes	✔ Yes	✔ Yes	✖ No	✔ Yes	✖ No	✔ Yes	✖ No	✔ Yes	✔ Yes	✔ Yes	✖ No
South Australia- Community Paramedic Program	✔ Yes	✔ Yes	✖ No	✖ No	✖ No	✖ No	✔ Yes	✖ No	✖ No	✖ No	✔ Yes	✔ Yes	✔ Yes	✔ Yes	✔ Yes	✖ No	✔ Yes	✔ Yes	✔ Yes	✖ No	✔ Yes	✖ No	✔ Yes	✔ Yes	✔ Yes	✖ No	✖ No	✖ No	✖ No	✖ No
Tasmania- Ambulance Tasmania	✔ Yes	✖ No	✖ No	✔ Yes	✔ Yes	✖ No	✔ Yes	✔ Yes	✔ Yes	✖ No	✔ Yes	✔ Yes	✔ Yes	✖ No	✖ No	✖ No	✖ No	✖ No	✔ Yes	✖ No	✔ Yes	✖ No	✖ No	✔ Yes	✔ Yes	✖ No	✖ No	✔ Yes	✔ Yes	✖ No
Victoria- Ambulance Victoria	✖ No	✖ No	✖ No	✖ No	✖ No	✖ No	✖ No	✖ No	✖ No	✖ No	✖ No	✖ No	✖ No	✖ No	✖ No	✖ No	✔ Yes	✖ No	✔ Yes	✖ No	✖ No	✖ No	✖ No	✖ No	✖ No	✖ No	✖ No	✖ No	✖ No	✖ No
Alberta	✔ Yes	✔ Yes	✔ Yes	✔ Yes	✔ Yes	✖ No	✔ Yes	✔ Yes	✔ Yes	✖ No	✖ No	✔ Yes	✔ Yes	✔ Yes	✔ Yes	✔ Yes	✔ Yes	✔ Yes	✔ Yes	✔ Yes	✔ Yes	✖ No	✔ Yes	✔ Yes	✔ Yes	✖ No	✖ No	✔ Yes	✔ Yes	✖ No
British Columbia- BCEHS	✔ Yes	✖ No	✖ No	✖ No	✖ No	✖ No	✖ No	✖ No	✖ No	✖ No	✖ No	✔ Yes	✖ No	✔ Yes	✖ No	✔ Yes	✔ Yes	✔ Yes	✔ Yes	✖ No	✖ No	✖ No	✖ No	✔ Yes	✔ Yes	✔ Yes	✖ No	✖ No	✖ No	✖ No	✖ No
Manitoba	✖ No	✔ Yes	✖ No	✔ Yes	✖ No	✖ No	✖ No	✖ No	✖ No	✖ No	✖ No	✖ No	✔ Yes	✔ Yes	✔ Yes	✖ No	✖ No	✖ No	✔ Yes	✖ No	✔ Yes	✖ No	✔ Yes	✔ Yes	✖ No	✖ No	✖ No	✖ No	✖ No	✖ No
Newfoundland and Labrador	✔ Yes	✔ Yes	✖ No	✔ Yes	✖ No	✖ No	✖ No	✖ No	✔ Yes	✖ No	✖ No	✔ Yes	✔ Yes	✔ Yes	✖ No	✔ Yes	✔ Yes	✔ Yes	✔ Yes	✔ Yes	✔ Yes	✖ No	✖ No	✔ Yes	✔ Yes	✖ No	✖ No	✖ No	✖ No	✖ No
Ontario, County of Renfrew Paramedic Service	✖ No	✔ Yes	✖ No	✔ Yes	✖ No	✖ No	✖ No	✖ No	✔ Yes	✖ No	✖ No	✔ Yes	✔ Yes	✔ Yes	✖ No	✔ Yes	✔ Yes	✔ Yes	✔ Yes	✔ Yes	✔ Yes	✖ No	✖ No	✔ Yes	✔ Yes	✖ No	✖ No	✖ No	✖ No	✖ No
Prince Edward Island, Island EMS	✖ No	✔ Yes	✖ No	✔ Yes	✖ No	✔ Yes	✔ Yes	✖ No	✖ No	✖ No	✖ No	✔ Yes	✔ Yes	✔ Yes	✔ Yes	✔ Yes	✔ Yes	✔ Yes	✔ Yes	✖ No	✔ Yes	✖ No	✔ Yes	✔ Yes	✔ Yes	✖ No	✖ No	✔ Yes	✖ No	✖ No
Saskatchewan	✔ Yes	✔ Yes	✖ No	✔ Yes	✖ No	✖ No	✔ Yes	✖ No	✔ Yes	✖ No	✔ Yes	✔ Yes	✔ Yes	✔ Yes	✔ Yes	✔ Yes	✔ Yes	✔ Yes	✔ Yes	✔ Yes	✔ Yes	✖ No	✔ Yes	✔ Yes	✔ Yes	✖ No	✖ No	✖ No	✖ No	✖ No
Finland	✔ Yes	✖ No	✖ No	✔ Yes	✖ No	✖ No	✔ Yes	✖ No	✔ Yes	✖ No	✖ No	✔ Yes	✔ Yes	✔ Yes	✖ No	✔ Yes	✔ Yes	✖ No	✔ Yes	✖ No	✔ Yes	✖ No	✖ No	✔ Yes	✖ No	✔ Yes	✖ No	✖ No	✔ Yes	✖ No
Southwest Finland	✖ No	✔ Yes	✔ Yes	✔ Yes	✖ No	✖ No	✔ Yes	✔ Yes	✔ Yes	✖ No	✔ Yes	✔ Yes	✔ Yes	✖ No	✖ No	✖ No	✔ Yes	✖ No	✔ Yes	✖ No	✔ Yes	✖ No	✔ Yes	✔ Yes	✔ Yes	✖ No	✖ No	✖ No	✖ No	✖ No
Ireland, Dublin and surrounding counties	✔ Yes	✔ Yes	✖ No	✔ Yes	✔ Yes	✖ No	✔ Yes	✔ Yes	✔ Yes	✖ No	✖ No	✖ No	✖ No	✖ No	✖ No	✖ No	✖ No	✖ No	✖ No	✖ No	✖ No	✖ No	✖ No	✖ No	✖ No	✖ No	✖ No	✖ No	✖ No	✖ No
New Zealand- St Johns Ambulance	✔ Yes	✔ Yes	✖ No	✔ Yes	✔ Yes	✖ No	✔ Yes	✔ Yes	✔ Yes	✖ No	✔ Yes	✔ Yes	✔ Yes	✔ Yes	✔ Yes	✖ No	✔ Yes	✖ No	✔ Yes	✔ Yes	✔ Yes	✔ Yes	✖ No	✔ Yes	✔ Yes	✖ No	✔ Yes	✔ Yes	✔ Yes	✖ No
North West Ambulance Service	✔ Yes	✖ No	✖ No	✖ No	✔ Yes	✖ No	✔ Yes	✖ No	✖ No	✖ No	✖ No	✖ No	✖ No	✖ No	✖ No	✖ No	✖ No	✖ No	✔ Yes	✖ No	✔ Yes	✖ No	✔ Yes	✔ Yes	✖ No	✖ No	✖ No	✖ No	✖ No	✖ No
London	✔ Yes	✔ Yes	✔ Yes	✔ Yes	✔ Yes	✖ No	✔ Yes	✔ Yes	✖ No	✖ No	✖ No	✔ Yes	✔ Yes	✔ Yes	✖ No	✔ Yes	✔ Yes	✔ Yes	✔ Yes	✔ Yes	✖ No	✔ Yes	✖ No	✖ No	✔ Yes	✖ No	✖ No	✔ Yes	✔ Yes	✔ Yes
London, Community Independence Service	✔ Yes	✔ Yes	✖ No	✔ Yes	✖ No	✖ No	✖ No	✖ No	✖ No	✖ No	✖ No	✔ Yes	✖ No	✔ Yes	✖ No	✖ No	✖ No	✖ No	✖ No	✔ Yes	✔ Yes	✖ No	✖ No	✖ No	✖ No	✖ No	✖ No	✖ No	✖ No	✖ No
Northern Ireland	✔ Yes	✔ Yes	✖ No	✔ Yes	✔ Yes	✖ No	✖ No	✖ No	✖ No	✖ No	✖ No	✔ Yes	✔ Yes	✖ No	✖ No	✔ Yes	✖ No	✔ Yes	✔ Yes	✔ Yes	✔ Yes	✖ No	✖ No	✖ No	✖ No	✖ No	✖ No	✔ Yes	✖ No	✖ No
Scotland	✔ Yes	✔ Yes	✖ No	✔ Yes	✔ Yes	✖ No	✔ Yes	✔ Yes	✖ No	✖ No	✖ No	✔ Yes	✔ Yes	✔ Yes	✖ No	✖ No	✔ Yes	✖ No	✔ Yes	✔ Yes	✔ Yes	✔ Yes	✔ Yes	✔ Yes	✖ No	✖ No	✖ No	✔ Yes	✔ Yes	✖ No
Wales	✔ Yes	✔ Yes	✔ Yes	✔ Yes	✔ Yes	✔ Yes	✔ Yes	✔ Yes	✔ Yes	✖ No	✖ No	✔ Yes	✔ Yes	✔ Yes	✔ Yes	✔ Yes	✔ Yes	✔ Yes	✔ Yes	✔ Yes	✔ Yes	✖ No	✔ Yes	✔ Yes	✖ No	✖ No	✔ Yes	✔ Yes	✔ Yes	✔ Yes
Colorado/Delta County/Delta County Ambulance District	✔ Yes	✔ Yes	✔ Yes	✔ Yes	✔ Yes	✔ Yes	✔ Yes	✖ No	✔ Yes	✖ No	✖ No	✔ Yes	✔ Yes	✔ Yes	✔ Yes	✔ Yes	✔ Yes	✔ Yes	✔ Yes	✔ Yes	✔ Yes	✖ No	✔ Yes	✔ Yes	✖ No	✖ No	✖ No	✔ Yes	✖ No	✖ No
Florida- Seminole County City of Sanford EMS	✔ Yes	✖ No	✖ No	✖ No	✖ No	✖ No	✔ Yes	✖ No	✖ No	✖ No	✔ Yes	✔ Yes	✔ Yes	✔ Yes	✔ Yes	✔ Yes	✔ Yes	✔ Yes	✔ Yes	✖ No	✖ No	✖ No	✔ Yes	✔ Yes	✔ Yes	✖ No	✖ No	✖ No	✖ No	✖ No
Gulf of Mexico (AL/MS/LA/TX)- Off-shore / Remote services.	✔ Yes	✖ No	✖ No	✔ Yes	✖ No	✖ No	✔ Yes	✔ Yes	✖ No	✖ No	✖ No	✖ No	✔ Yes	✔ Yes	✔ Yes	✖ No	✔ Yes	✔ Yes	✔ Yes	✖ No	✖ No	✖ No	✖ No	✖ No	✖ No	✖ No	✖ No	✔ Yes	✖ No	✖ No
North Carolina- Wilmington	✔ Yes	✔ Yes	✖ No	✔ Yes	✖ No	✔ Yes	✔ Yes	✖ No	✔ Yes	✔ Yes	✔ Yes	✔ Yes	✔ Yes	✔ Yes	✖ No	✔ Yes	✔ Yes	✔ Yes	✔ Yes	✔ Yes	✔ Yes	✖ No	✔ Yes	✔ Yes	✖ No	✖ No	✖ No	✔ Yes	✖ No	✖ No
North Carolina/Fayetteville- Cumberland County EMS	✔ Yes	✔ Yes	✔ Yes	✖ No	✖ No	✔ Yes	✖ No	✖ No	✖ No	✖ No	✖ No	✔ Yes	✔ Yes	✔ Yes	✖ No	✔ Yes	✔ Yes	✔ Yes	✔ Yes	✖ No	✔ Yes	✔ Yes	✔ Yes	✔ Yes	✔ Yes	✖ No	✖ No	✖ No	✖ No	✖ No
South Carolina- Marlboro County EMS	✔ Yes	✖ No	✖ No	✖ No	✖ No	✖ No	✖ No	✖ No	✖ No	✖ No	✖ No	✔ Yes	✖ No	✔ Yes	✖ No	✔ Yes	✔ Yes	✖ No	✖ No	✖ No	✔ Yes	✖ No	✖ No	✖ No	✖ No	✖ No	✖ No	✔ Yes	✖ No	✖ No
South Carolina- Lexington County EMS	✔ Yes	✖ No	✖ No	✖ No	✖ No	✖ No	✖ No	✖ No	✖ No	✖ No	✖ No	✖ No	✖ No	✔ Yes	✖ No	✖ No	✔ Yes	✖ No	✔ Yes	✖ No	✔ Yes	✖ No	✔ Yes	✔ Yes	✖ No	✖ No	✖ No	✖ No	✖ No	✖ No
Texas- MedStar Mobile Healthcare	✔ Yes	✔ Yes	✖ No	✔ Yes	✖ No	✖ No	✔ Yes	✖ No	✔ Yes	✖ No	✖ No	✔ Yes	✔ Yes	✖ No	✖ No	✔ Yes	✔ Yes	✔ Yes	✔ Yes	✔ Yes	✔ Yes	✖ No	✔ Yes	✔ Yes	✔ Yes	✖ No	✖ No	✖ No	✖ No	✖ No

Appendix J

EXAMPLE PARAMEDICINE HEALTHCARE FRAMEWORK

Curriculum Guidance Document

Introduction to the framework

Purpose

The Paramedicine Healthcare Framework (PHF) serves as a comprehensive and structured framework for developing paramedicine curricula across Australia. Its primary objective is to align educational programs with national accreditation standards and paramedicine's evolving professional practice requirements. By providing a clear structure and set of guiding principles, the PHF ensures that paramedic education is standardised and relevant to the current and future needs of the healthcare system, students, and the broader community.

The PHF offers an evidence-based approach that draws upon the latest advancements in paramedic practice, research, and educational methodologies. It highlights the importance of preparing paramedic graduates who are competent in their technical skills and can think critically, make sound clinical judgments, and provide high-quality, patient-centred care in dynamic and often challenging environments. Using the PHF, paramedic programs are designed to equip students with the necessary knowledge, skills, and attitudes to excel in their roles and contribute positively to the health and well-being of the community.

The framework also emphasises the development of lifelong learning practices, fostering the growth of paramedics capable of adapting to new technologies, evolving clinical practices, and emerging healthcare needs. This ensures that graduates are prepared for a career of continuous professional development and can effectively respond to the challenges posed by a rapidly changing healthcare landscape.

Scope

The scope of the PHF framework encompasses all aspects of paramedicine program development, from curriculum design to delivery and assessment. This framework provides educators and accreditation bodies a clear roadmap to ensure consistency, quality, and relevance across paramedic education programs. By addressing all stages of the educational process, from entry-level training to advanced practice, the PHF ensures that each aspect of paramedic education aligns with professional and accreditation standards.

Regarding curriculum design, the PHF guides the creation of learning outcomes and course structures that reflect both the theoretical and practical components required in paramedic practice. These learning outcomes foster a comprehensive understanding of paramedicine's clinical aspects, ensuring that students are prepared for real-world practice in diverse settings, including emergency services, community care, and critical care transport.

Regarding curriculum delivery, the PHF emphasises integrating evidence-based teaching practices that promote active learning, critical thinking, and problem-solving. It calls for diverse pedagogical approaches, including simulation, case-based learning, and experiential learning, to develop the clinical judgment and decision-making skills essential for paramedic practice. The framework also stresses the importance of clinical placements and field experiences, where students can apply their knowledge in real-world situations under the supervision of experienced paramedic professionals.

The PHF'S assessment component ensures that student progress is continuously monitored and evaluated against clearly defined learning outcomes. Assessment methods are designed to be both formative and summative, incorporating various tools such as clinical exams, reflective journals, practical skills assessments, and simulation exercises. These assessments evaluate the full spectrum of competencies required for effective paramedic practice, from clinical knowledge and technical proficiency to communication, leadership, and ethical decision-making.

Overall, the PHF framework guides the design, implementation, and evaluation of paramedic education programs to ensure that they prepare graduates who are not only highly skilled but also capable of meeting the complex challenges of modern healthcare. Through its structured approach, the NET ensures that paramedic education remains dynamic, flexible, and responsive to the profession's needs, healthcare systems, and community.

Core Components of the Framework

The PHF for Paramedicine consists of six interconnected core components that collectively define the approach to paramedic education. These components ensure that the curriculum aligns with national accreditation standards and addresses the evolving demands of healthcare practice, emphasising patient-centred care, clinical judgment, skill development, and evidence-based decision-making.

Paramedicine Health Care Curriculum

Focus:

The Paramedicine Health Care Curriculum is the foundational structure for integrating patient care, clinical decision-making, and healthcare standards into paramedic practice. It guides the development of a comprehensive curriculum that supports the holistic education of paramedic students, preparing them for real-world challenges in pre-hospital care. This framework ensures that the practice of paramedicine is not only responsive to immediate healthcare needs but is also aligned with broader healthcare objectives and standards. It encompasses the entire continuum of paramedic care, from initial assessment and emergency interventions to long-term patient management and handover to other healthcare professionals.

Application:

Curriculum developers will use the Paramedicine Health Care Curriculum as the guiding principle for structuring learning outcomes across all paramedicine programs. This will ensure that students receive an education that adheres to national healthcare standards and is adaptable to the evolving scope of paramedic practice.

1. Units of Study:

Unit 1: Foundations of Paramedicine and Healthcare Standards

Learning Outcomes:

- Understand the healthcare system and the role of paramedics in patient care.
- Demonstrate knowledge of healthcare standards and protocols that guide paramedic practice.
- Analyse the evolving needs of paramedic practice in response to public health issues and emerging medical technologies.

Unit 2: Patient Assessment and Clinical Decision-Making

Learning Outcomes:

- Develop clinical assessment skills to identify and prioritise patient needs.
- Apply evidence-based clinical decision-making to patient care.

- Evaluate and critique clinical scenarios to determine appropriate patient management strategies.

Unit 3: Trauma and Medical Emergencies

Learning Outcomes:

- Apply paramedic interventions for trauma and medical emergencies, including patient stabilisation, pain management, and transport protocols.
- Evaluate patient responses to interventions and adjust care as required.

Unit 4: Paramedicine in Primary and Community Care

Learning Outcomes:

- Understand the role of paramedics in primary healthcare, including disease prevention, health promotion, and managing chronic conditions.
- Integrate community-based care into paramedic practice, focusing on patient-centred approaches.

Unit 5: Ethical and Legal Aspects of Paramedicine

Learning Outcomes:

- Recognise ethical issues related to paramedic practice, including patient consent, confidentiality, and professional boundaries.
- Demonstrate understanding of the legal responsibilities of paramedics in healthcare settings.

2. Pedagogical Approach:

Active Learning and Simulation-Based Education: The curriculum should integrate simulation-based learning activities that closely mirror real-life scenarios, fostering clinical decision-making and patient care skills. For example, students should role-play primary health care conditions, where they must apply their knowledge of healthcare standards, clinical assessments, and intervention strategies.

Collaborative Learning: Students will collaborate with peers and healthcare professionals to learn teamwork skills and gain a deeper understanding of interdisciplinary care, ensuring a well-rounded education that prepares them for the realities of paramedicine.

3. Key Competencies:

The curriculum will be designed to develop the following competencies in students based on the Paramedicine Health Care Curriculum:

- Clinical Judgment: Ability to assess and make decisions based on patient needs, clinical data, and evolving situations.
- Patient-Centred Care: Focus on delivering personalised care that respects patient autonomy and addresses their unique needs.
- Critical Thinking: The capacity to analyse complex scenarios and apply evidence-based practices to solve clinical problems.
- Adaptability: The ability to respond to changing healthcare environments, including technological innovations and public health priorities.

4. Assessment Methods:

- Student performance will be assessed and aligned with the learning outcomes defined in the curriculum. Methods will include:
- Practical assessments and simulations that assess clinical decision-making, patient care skills, and the ability to work under pressure.
- Viva Voce to assess theoretical understanding of healthcare systems, standards, and paramedic protocols.
- Case studies and reflective practice exercises to develop critical thinking and the ability to evaluate clinical performance.

By embedding these components into the curriculum design, the Paramedicine Health Care Curriculum will guide the development of a dynamic, patient-centred education that meets national standards and prepares paramedics to excel in their roles within the healthcare system.

Patient-Focused Teachings

Focus:

Patient-focused teachings emphasise developing paramedic professionals committed to delivering compassionate, culturally competent, and ethical care. These teachings emphasise the importance of treating patients holistically, considering their physical health needs and their emotional, psychological, and social well-being. The primary goal is to instil in students the understanding that care should always be tailored to the individual, ensuring that patient dignity, respect, and autonomy are upheld throughout the care process.

Application:

The curriculum for paramedicine education must integrate patient-focused teachings throughout the entire program. This involves theoretical learning and practical application, where students engage with diverse patient populations and practice applying the principles of patient-centred care in real-world settings.

1. Units of Study:

Unit 1: Introduction to Patient-Centred Care

Learning Outcomes:

- Define the concept of patient-centred care and its relevance to paramedicine.
- Demonstrate understanding the ethical, legal, and professional principles guiding patient-centred practices.
- Identify strategies for involving patients in decision-making processes regarding their care.

Unit 2: Communication Skills for Paramedics

Learning Outcomes:

- Develop effective verbal and non-verbal communication skills for interacting with patients, families, and healthcare teams.
- Demonstrate empathy and cultural sensitivity in all communications.
- Use active listening techniques to assess and address patient needs accurately.

Unit 3: Cultural Competence in Paramedicine

- Recognise the impact of cultural differences on health beliefs, behaviours, and care preferences.
- Demonstrate culturally competent care practices when interacting with patients from diverse backgrounds.
- Reflect on how personal biases and cultural perceptions influence patient interactions and decision-making.

Unit 4: Ethics and Professionalism in Paramedicine

Learning Outcomes:

- Apply ethical principles (e.g., beneficence, autonomy, justice) to complex paramedic care scenarios.
- Recognise ethical dilemmas in paramedic practice and use decision-making frameworks to resolve them.
- Demonstrate professional conduct and ethical responsibility when interacting with patients and colleagues.

Unit 5: Holistic Assessment and Care

Learning Outcomes:

- Conduct comprehensive assessments considering the physical, emotional, psychological, and social factors affecting patient health.
- Develop individualised care plans that address all aspects of a patient's well-being.
- Apply the principles of holistic care in paramedic practice, ensuring that all aspects of patient health are considered in decision-making.

2. Pedagogical Approach:

Lecture-Based Learning: Introduction to key concepts and frameworks for patient-centred care.

Interactive Discussions: Case studies and role-playing to encourage student engagement with patient perspectives.

Scenario-Based Learning: Real-life paramedic scenarios highlight the importance of placing the patient at the centre of care.

Simulation-Based Learning: Role-playing with peers and standardised patients (actors) to practice communication techniques.

Group Discussions: Facilitated discussions on communication challenges in paramedic practice and cultural competence.

Interactive Workshops: Workshops on non-verbal communication, including body language and tone, using video feedback.

Cultural Immersion Activities: Exposure to different cultural contexts through field visits or community engagement.

Case-Based Learning: Use case studies highlighting cultural differences in healthcare preferences.

Guest Speakers/Workshops: Experts in cultural competence led workshops to provide real-world insights.

Clinical Placements: Supervised fieldwork where students can practice holistic assessments and integrate patient care into real-world settings.

3. Key Competencies:

- Effective communication and engagement with patients.
- Understanding of ethical principles such as autonomy and informed consent.
- Ability to incorporate patient preferences into care planning.
- Empathy and active listening skills.
- Effective use of verbal and non-verbal communication in high-pressure situations.
- Cultural sensitivity and awareness in communication.
- Cultural awareness and understanding of health disparities.
- Ability to engage with patients in culturally sensitive ways.
- Reflective practice to identify and address personal biases.
- Comprehensive assessment skills (physical, emotional, psychological, social).
- Ability to develop and implement personalised care plans.
- A holistic approach to patient care.

4. Assessment Methods:

- Case Study Analysis: Students analyse a scenario involving patient-centred care, identifying key decisions made and how they impacted patient outcomes.
- Written Reflection: Students reflect on a real or hypothetical patient encounter, considering how they might improve patient-centred approaches.
- Oral Presentation: Students present a patient-centred care plan for a given case, outlining patient preferences and involvement.
- Simulation Assessment: Students participate in a simulated patient interaction, demonstrating their ability to communicate effectively and empathetically.
- Peer Feedback: Peer evaluations of communication during simulations, focusing on clarity, empathy, and professionalism.
- Reflective Journal: Students keep a journal documenting their experiences and reflections on cultural competence in practice.
- Case Study Presentations: Students analyse a case involving cultural considerations in patient care and propose solutions.
- Cultural Sensitivity Survey: Students complete surveys evaluating their own cultural competence with reflective feedback.
- Ethical Dilemma Analysis Paper: Students write a paper analysing an ethical dilemma, justifying their decision-making process.
- Role-Play Assessment: Students demonstrate their ability to make ethical decisions during role-play scenarios.
- Clinical Case Reports: Students submit detailed reports of patient assessments, including physical, emotional, and social considerations.
- Clinical Competency Checklist: Evaluations based on students' ability to perform holistic assessments during clinical placements.
- Peer and Self-Reflection: Students assess their own and peers' ability to deliver holistic care in practice with reflective feedback.
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Clinical Judgment Teachings

Focus:

Clinical Judgment Teachings focus on developing students' critical thinking and decision-making skills in clinical contexts. This component is crucial for paramedics, who must make quick, accurate decisions under pressure in dynamic and complex environments. By fostering clinical reasoning and judgment, students will be better equipped to assess, plan, and execute appropriate interventions, ensuring patient safety and optimal outcomes.

Application:

The curriculum must integrate scenarios, simulations, and case studies that mimic paramedics' real-world challenges. Students can develop the cognitive skills required to apply knowledge effectively, analyse situations, and make informed, evidence-based decisions by engaging with these learning opportunities. These skills are essential for responding to the varied and often unpredictable situations in paramedicine.

1. Units of Study:

Unit 1: Clinical Judgment in Paramedicine

Learning Outcomes:

- Understand the key concepts and principles of clinical judgment and reasoning in paramedicine.
- Identify the factors influencing clinical decision-making, including knowledge, experience, intuition, and environmental context.
- Apply the clinical decision-making process to routine paramedic scenarios.

Unit 2: Advanced Clinical Reasoning and Diagnostic Skills

Learning Outcomes:

- Apply advanced clinical reasoning techniques to assess and diagnose complex patient presentations.
- Develop and justify a differential diagnosis for a range of clinical scenarios.

- Formulate and implement appropriate treatment plans based on patient assessments.

Unit 3: Evidence-Based Practice and Clinical Judgment

Learning Outcomes:

- Integrate the best available evidence into clinical decision-making to improve patient outcomes.
- Critically appraise clinical guidelines, research studies, and patient data to inform decisions.
- Evaluate the strengths and limitations of evidence when making clinical judgments.

Unit 4: Managing Complexity in Paramedic Practice

Learning Outcomes:

- Analyse and prioritise competing clinical needs in complex, multi-faceted patient presentations.
- Develop strategies for managing time, resources, and team dynamics in high-stress clinical situations.
- Apply clinical judgment in multi-patient scenarios, ensuring that urgent needs are addressed effectively.

2. Pedagogical Approach:

Lecture and Seminar-Based Learning: Lectures introduce the theory behind clinical decision-making, followed by seminars for deeper discussion.

Interactive Case Studies: Explore clinical decision-making frameworks through real-world examples.

Small Group Discussions: Encourage students to analyse clinical situations and discuss possible decisions and their rationales.

Scenario-Based Learning: Use case scenarios involving complex patient presentations to promote diagnostic reasoning.

Peer Teaching: Students work in groups to create diagnostic pathways and justify their reasoning to peers.

Evidence Review Workshops: Students learn to search for, analyse, and apply current evidence in clinical contexts.

Research Seminars: Seminars focusing on understanding research methodologies and evidence appraisal techniques.

Team-Based Simulations: Engage students in team-based exercises that mirror high-stakes situations with multiple patients.

Role-Playing & Problem-Solving Exercises: Students take on different roles in managing a clinical case, including team leader, clinician, and communicator.

Interprofessional Education (IPE): Collaborate with other healthcare programs (e.g., nursing, paramedics, and medical students) to manage complex cases in a multidisciplinary setting.

3. Key Competencies:

- Knowledge of clinical decision-making models.
- Ability to recognise personal biases in clinical practice.
- Use of evidence-based guidelines to inform decisions.
- Advanced assessment and diagnostic skills.
- Application of critical thinking to form differential diagnoses.
- Clinical decision-making under pressure.
- Ability to critically appraise and apply research evidence in clinical decision-making.
- Integration of evidence-based guidelines into practice.
- Judicious evaluation of clinical outcomes based on available evidence.
- Ability to assess and prioritise multi-system pathologies in paramedic practice.
- Effective clinical decision-making in complex patient situations.
- Risk management and the ability to navigate clinical uncertainties.

4. Assessment Methods:

- Case Study Analysis: Written analysis of a clinical case, outlining the decision-making process and rationale behind chosen interventions.

- Group Presentation: Present a decision-making framework applied to a real-world clinical scenario.
- Clinical Reasoning Exams: Objective assessments that require students to diagnose a simulated patient and justify their reasoning in writing.
- Simulation Assessment: Students demonstrate their clinical reasoning during a simulation exercise, focusing on accurate diagnosis and effective treatment decisions.
- Reflective Report: Students reflect on their decision-making process, challenges faced, and strategies used to manage complex cases.

Skills-Based Teachings

Focus:

Skills-based teachings emphasise practical, hands-on abilities essential for paramedic practice. Integrating the Dreyfus Model of Skill Acquisition provides a structured approach to the progressive development of expertise, guiding students from novices to proficient practitioners. This model informs curriculum design by scaffolding learning experiences that align with each stage of skill acquisition: Novice, Advanced Beginner, Competent, Proficient, and Expert.

Application:

The curriculum includes practical components, such as workshops, simulations, and field placements, designed to match students' skill levels and foster progression through the Dreyfus stages. By embedding the model into teaching and assessment strategies, students gain confidence and competence in applying technical, clinical, and interpersonal skills in real-world settings.

1. Units of Study:

Unit 1: Foundations of Paramedic Practice (Novice)

Learning Outcomes:

- Identify and follow basic protocols for patient assessment and care.
- Safely perform foundational clinical skills under supervision.
- Demonstrate adherence to infection control and safety guidelines.

Pedagogical Approach:

Rule-Based Learning: Students learn basic principles and guidelines to manage standard situations.

Step-by-Step Demonstrations: Clear, structured instructions for performing foundational skills.

Simulated Environments: Provide controlled settings for practising basic tasks.

Key Competencies:

- Basic clinical skills and adherence to protocols.
- Accurate observation and recording of patient data.
- Safe practice in controlled environments.

Assessment Methods:

- Practical Checklists: Evaluate adherence to protocols during skills practice.
- Written Quizzes: Test understanding of basic procedures and guidelines.
- Reflective Journals: Encourage self-assessment and identification of learning gaps.

Unit 2: Advanced Life Support Techniques (Advanced Beginner)

Learning Outcomes:

- Apply learned protocols to perform advanced clinical procedures with minimal supervision.
- Begin to recognise patterns in patient presentations.
- Implement emergency interventions such as advanced airway management and defibrillation.

Pedagogical Approach:

Pattern Recognition Training: Introduce common patient scenarios to foster experiential learning.

Supervised Practice: Gradually reduce supervision as students demonstrate growing competence.

Scaffolded Feedback: Provide targeted feedback to enhance skill accuracy and precision.

Key Competencies:

- Advanced airway and cardiac emergency management.
- Recognition of patient deterioration and appropriate response.
- Safe medication administration.
- Assessment Methods:
- Simulation-Based Assessments: Evaluate responses to realistic emergency scenarios.
- Supervisor Observation: Monitor skill application during workshops.
- Formative Feedback: Regular, structured feedback to reinforce skill development and progress.

Unit 3: Primary Health Care in Paramedicine (Competent)

Learning Outcomes:

- Explain the principles of primary health care and its application in paramedicine.
- Conduct comprehensive health assessments in diverse populations, including rural and underserved communities.
- Design and implement health promotion strategies tailored to the specific needs of individual communities.
- Collaborate with multidisciplinary teams to manage chronic conditions and provide continuity of care.
- Integrate evidence-based practice into primary health care delivery.

Key Competencies:

- Primary Health Care Delivery: Skills in assessing and managing non-urgent health concerns, promoting health, and preventing disease.

- Chronic Disease Management: Proficiency in assisting patients with diabetes, hypertension, and asthma.
- Community Health Advocacy: The ability to educate and empower communities to achieve improved health outcomes.
- Cultural Competence: Communication skills with diverse populations, including Aboriginal and Torres Strait Islander peoples.
- Multidisciplinary Collaboration: Effective communication and teamwork with healthcare providers across settings.

Pedagogical Approach:

Community Engagement Projects: Hands-on opportunities to engage with local communities and apply Public Health Concepts (PHC) principles.

Case-Based Learning (CBL): Explore complex primary care scenarios, such as chronic disease management and mental health interventions.

Simulation Exercises: Practice non-emergency skills such as wound care, medication reviews, and health screenings.

Interprofessional Education: Collaborate with students from nursing, social work, and allied health disciplines.

Assessment Methods:

- Community Health Project: Students design and implement a small-scale health promotion initiative, documenting their efforts in a reflective report.
- Case Study Analysis: Conduct written evaluations of complex primary health care (PHC) scenarios, including recommended interventions.
- Simulation-Based Assessment: Students demonstrate primary care skills in scenarios such as managing minor wounds or conducting a medication review.
- Peer and Mentor Evaluations: Feedback on teamwork and patient interactions during placements.
- Portfolio Submission: Documentation of PHC learning experiences, reflections, and demonstrated competencies.

Unit 4: Emergency Field Placement (Proficient)

Learning Outcomes:

- Adapt to dynamic and complex situations with minimal supervision.
- Demonstrate situational awareness and flexible problem-solving.
- Integrate theoretical knowledge with practical skills in real-world contexts.

Pedagogical Approach:

Real-World Exposure: Students work in authentic emergency settings under the guidance of paramedic mentors.

Reflective Practice: Engage in daily debriefings and journaling to reinforce learning and foster self-assessment.

Progressive Responsibility: Students take on increasingly independent roles during placements.

Key Competencies:

- Advanced situational judgment and adaptability.
- Professional communication with patients and multidisciplinary teams.
- Ethical and patient-centred decision-making in complex cases.

Assessment Methods:

- Mentor Evaluation: Assess ability to manage responsibilities independently.
- Case Log Analysis: Review documented cases for evidence of clinical reasoning.
- Peer Feedback: Incorporate insights from team members on-field performance.

Unit 5: Leadership in Emergency Practice (Expert)

Learning Outcomes:

- Lead complex emergency responses with confidence and strategic insight.
- Mentor and supervise peers or junior paramedics in clinical settings.
- Innovate and improve practices based on evidence and experience.

Pedagogical Approach:

Leadership Simulations: Develop and test leadership abilities in critical scenarios.

Case Studies of Best Practices: Explore advanced cases to identify innovative approaches and solutions.

Mentorship Opportunities: Experienced practitioners provide direct guidance to students.

Key Competencies:

- Strategic decision-making under pressure.
- Leadership and team coordination.
- Continuous improvement and innovation in practice.

Assessment Methods:

- Capstone Project: Develop and present a case study or practice improvement proposal.
- Leadership Simulation Assessment: Evaluate the ability to manage and lead a team in simulated crises.
- Self and Peer Reviews: Encourage critical reflection on leadership growth.

Outcomes-Based Curriculum

Focus:

An outcomes-based curriculum prioritises achieving clear, measurable learning outcomes that reflect industry standards and professional competencies. These outcomes ensure that graduates are well-prepared to meet the demands of clinical practice, engage in lifelong learning, and adapt to evolving roles in paramedicine.

Application:

Curriculum developers will align instructional methods, assessments, and learning experiences with specific outcomes. These outcomes emphasise critical thinking, patient-centred care, clinical reasoning, and technical proficiency, ensuring a direct connection between educational activities and professional expectations.

1. Units of Study:

Unit 1: Foundations of Paramedicine Practice

Learning Outcomes**:**

- Explain the professional, ethical, and legal responsibilities of paramedics.
- Demonstrate effective communication and teamwork in healthcare settings.
- Apply foundational medical knowledge to patient assessment and care.

Pedagogical Approach:

Interactive Lectures: Covers professional standards and ethical considerations.

Case-Based Discussions: Encourages application of ethical principles to real-world scenarios.

Key Competencies:

- Professional accountability.
- Team collaboration.
- Foundational knowledge of pathophysiology and pharmacology.

Assessment Methods:

- Written assignments on ethical dilemmas.
- Team-based scenario exercises.

Unit 2: Advanced Clinical Skills

Learning Outcomes:

- Perform advanced life support procedures in simulated and authentic settings.
- Interpret diagnostic tools such as ECGs and blood glucose monitors.
- Manage critical incidents with evidence-based decision-making.

Pedagogical Approach:

Simulation Training: Focused on developing technical skills, including intubation and defibrillation.

Scenario-Based Learning: Replicates high-pressure emergencies.

Key Competencies:

- Advanced technical skills in emergency care.
- Critical incident management.

- Diagnostic interpretation.

Assessment Methods:

- Practical skills assessments.
- Scenario-based evaluations.

Unit 3: Community-Based Paramedicine

Learning Outcomes:

- Assess and manage non-urgent medical conditions.
- Implement preventative care strategies tailored to community needs.
- Work collaboratively with other healthcare providers to deliver holistic care.

Pedagogical Approach:

Community Placements: Provides hands-on experience in non-emergency settings.

Problem-Based Learning (PBL): Focuses on chronic disease management cases.

Key Competencies:

- Holistic patient assessment.
- Preventative care.
- Multidisciplinary collaboration.

Assessment Methods:

- Portfolio documenting placement experiences.
- Reflective journals on community engagement.

Complex Adaptive Curriculum

Focus:

A complex adaptive curriculum emphasises navigating dynamic, unpredictable, and multifaceted healthcare environments. Paramedic students possess the skills to make rapid, informed decisions in scenarios where conditions change frequently, necessitating their ability to adapt to emerging challenges in emergency care, public health crises, and technological integration.

Application:

The curriculum integrates innovative teaching methods and flexible content to address new healthcare needs, technological advancements, and the expanding scope of paramedicine. It prepares graduates to be proactive problem-solvers and agile professionals capable of thriving in complex systems.

1. Units of Study

Unit 1: Dynamic Decision-Making in Emergency Care

Learning Outcomes:

- Analyse complex scenarios to make timely and effective clinical decisions.
- Apply adaptive reasoning to rapidly changing emergencies.
- Evaluate the impact of decisions on patient outcomes and team dynamics.

Pedagogical Approach:

Dynamic Scenario Simulations: Students manage scenarios with real-time variable changes.

Debriefing Sessions: Structured reflection on decision-making processes and outcomes.

Key Competencies:

- Adaptive clinical reasoning.
- Rapid situational assessment.
- Effective prioritisation under pressure.

Assessment Methods:

- Simulation-based performance evaluations.
- Structured reflective journals.

Unit 2: Emerging Technologies in Paramedicine

Learning Outcomes:

- Integrate new technologies such as telehealth and AI into paramedic practice.
- Evaluate the ethical and practical implications of technology in emergency care.

- Adapt workflows to incorporate technological advancements in the field.

Pedagogical Approach:

Hands-On Technology Workshops: Practice with tools like wearable health monitors, AI diagnostics, and digital triage systems.

Case Studies: Explore scenarios where technology impacts decision-making and care delivery.

Key Competencies:

- Technological literacy.
- Workflow adaptability.
- Ethical decision-making regarding technology use.

Assessment Methods:

- Technology-based practical assessments.
- Case study analyses.

Unit 3: Crisis and Disaster Management

Learning Outcomes:

- Develop adaptive plans for managing large-scale emergencies and disasters.
- Collaborate with multidisciplinary teams under high-pressure conditions.
- Communicate effectively with stakeholders during crises.

Pedagogical Approach:

Crisis Simulation Exercises: Multi-agency disaster drills to simulate real-world emergencies.

Interprofessional Education (IPE): Collaboration with other healthcare students to address crisis scenarios.

Key Competencies:

- Crisis management and adaptability.
- Multidisciplinary collaboration.

- Effective communication under stress.

Assessment Methods:

- Group performance in disaster simulations.
- Crisis management plans and reflective analyses.

Unit 4: Systems Thinking in Paramedicine

Learning Outcomes:

- Analyse healthcare systems to identify areas for improvement.
- Adapt care delivery methods to align with the complexities of healthcare infrastructures.
- Anticipate and respond to cascading effects in dynamic systems.

Pedagogical Approach:

Systems Mapping Workshops: Explore interdependencies in healthcare systems.

Problem-Based Learning (PBL): Address challenges such as resource allocation and policy impacts.

Key Competencies:

- Systems analysis.
- Holistic problem-solving.
- Strategic adaptability.

Assessment Methods:

- Systems analysis projects.
- Problem-solving exercises based on real-world scenarios.

Example PHF curriculum

Matrix of Units of Study, Key Competencies, PHF, and Paramedicine Board Domains

Unit	**Key Competencies**	**PHF**	**Paramedicine Board Domains**
Year One			
Foundations of Paramedicine and Healthcare Standards	Professional accountability, ethical reasoning	Paramedicine Healthcare Framework	Domain 1: Professional and Ethical Practitioner
Patient Assessment and Clinical Decision-Making	Clinical reasoning, patient assessment	Clinical Judgment Teachings	Domain 5: Paramedicine Practitioner
Introduction to Patient-Centered Care	Patient communication, empathy, cultural competence	Patient-Focused Teachings	Domain 2: Communicator and Collaborator
Communication Skills for Paramedics	Verbal and non-verbal communication, patient education	Patient-Focused Teachings	Domain 2: Communicator and Collaborator
Anatomy and Physiology for Paramedics	Foundational biomedical knowledge, clinical application	Skills-Based Teachings	Domain 5: Paramedicine Practitioner

Ethics and Professionalism in Paramedicine	Ethical decision-making, legal responsibilities	Outcomes-Based Curriculum	Domain 1: Professional and Ethical Practitioner
Cultural Competence in Paramedicine	Culturally safe practice, engagement with diverse populations	Patient-Focused Teachings	Domain 2: Communicator and Collaborator
Simulation-Based Learning for Paramedics	Skill development, reflective practice	Skills-Based Teachings	Domain 5: Paramedicine Practitioner
Year Two			
Trauma and Medical Emergencies	Rapid decision-making, trauma management	Clinical Judgment Teachings	Domain 4: Safety and Risk Management Practitioner
Advanced Life Support Techniques	Cardiac and airway interventions, teamwork	Skills-Based Teachings	Domain 5: Paramedicine Practitioner
Holistic Assessment and Care	Comprehensive patient evaluation, biopsychosocial model	Patient-Focused Teachings	Domain 3: Evidence-Based Practitioner
Evidence-Based Practice and Clinical Judgment	Research literacy, critical appraisal, clinical application	Outcomes-Based Curriculum	Domain 3: Evidence-Based Practitioner
Community-Based Paramedicine	Preventive care, health promotion	Patient-Focused Teachings	Domain 5: Paramedicine Practitioner

Clinical Judgment in Paramedicine	Critical thinking, complex problem-solving	Clinical Judgment Teachings	Domain 3: Evidence-Based Practitioner
Health Law, Ethics, and Professional Practice	Legal compliance, patient advocacy	Outcomes-Based Curriculum	Domain 1: Professional and Ethical Practitioner
Managing Complexity in Paramedic Practice	Multitasking, prioritisation, resource allocation	Complex Adaptive Curriculum	Domain 4: Safety and Risk Management Practitioner
Year Three			
Primary Health Care in Paramedicine	Preventive care, chronic disease management	Outcomes-Based Curriculum	Domain 5: Paramedicine Practitioner
Emergency Field Placement	Clinical application, teamwork, real-world problem-solving	Skills-Based Teachings	Domain 5: Paramedicine Practitioner
Leadership in Emergency Practice	Leadership skills, team coordination, decision-making	Complex Adaptive Curriculum	Domain 1: Professional and Ethical Practitioner
Emerging Technologies in Paramedicine	AI applications, telehealth, digital tools	Complex Adaptive Curriculum	Domain 3: Evidence-Based Practitioner
Crisis and Disaster Management	Emergency planning,	Complex Adaptive Curriculum	Domain 4: Safety and Risk

	multidisciplinary collaboration		Management Practitioner
Dynamic Decision-Making in Emergency Care	Adaptive reasoning, situational awareness	Clinical Judgment Teachings	Domain 5: Paramedicine Practitioner
Systems Thinking in Paramedicine	Holistic problem-solving, interdependence awareness	Complex Adaptive Curriculum	Domain 4: Safety and Risk Management Practitioner
Advanced Clinical Skills	Advanced procedures, clinical judgment, reflective practice	Skills-Based Teachings	Domain 5: Paramedicine Practitioner