



REVIEWS

DEFINING ENTRY-TO-PRACTICE COMPETENCE IN PARAMEDICINE: A SCOPING REVIEW

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ABSTRACT

Objectives: Paramedics play a key role in unplanned, emergent, and episodic out-of-hospital health care. A comprehensive description of the minimally expected competencies (knowledge, skills, and attributes) necessary to perform the duties of a paramedic is required to build effective education programs and credentialing systems. This scoping review aimed to map and synthesize the literature describing entry-to-practice competence in paramedicine, including professional expectations and approaches used to assess readiness for independent practice.

Methods: A structured search of MEDLINE, EMBASE, Scopus, CINAHL, Google Scholar, and greyliit.org was undertaken for literature published between 1996 and 2026. The search included peer-reviewed literature published between 1 January 1996 and 1 January 2026.

Results: The four databases identified 8,231 records. After duplicates were removed, 6,755 records were screened and 99 full-text reports assessed. Twenty studies were identified through database searching and two additional studies through supplementary searching, resulting in 22 included studies. Three domains were identified: desirable non-technical attributes and professionalism, scope of practice, and assessment of competency. Secondary domains were assigned where studies addressed more than one area.

Conclusions: Entry-to-practice paramedic competence is consistently described across three interrelated domains: desirable non-technical attributes and professionalism, scope of practice, and assessment of competency. These findings can inform curriculum design, accreditation, and workplace-based assessment approaches in paramedicine.

INTRODUCTION

Paramedics and the out-of-hospital services they provide are increasingly being considered an essential component of health care systems worldwide (Bhattarai et al., 2023). In countries with developed emergency medical care systems, the public has come to expect that a single call to a universal phone number will rapidly bring competent and well-equipped health providers to their side (Crowe et al., 2016). Recent work has also shown considerable variation in paramedic system design, including differences in professional autonomy, governance, and work-

force organization (Makrides et al., 2022, 2023). This expectation not only creates an economic and logistical challenge but also an education and performance verification challenge. This variation in paramedic roles, professional expectations, and models of practice presents challenges for educators and workforce planners across different health systems (Batt et al., 2025; Bhattarai et al., 2023). Further, because paramedics respond to life-threatening emergencies, reasonable competence of the provider is a clear public expectation. This has led to the registration of paramedics as health care professionals in a number of jurisdictions (e.g., Australia, Canada, Ireland and the United Kingdom) (Reed et al., 2022; Weber et al., 2024a). Without an appropriately identified competency framework required for professional practice, downstream activities such as curriculum development and assessment of competence can compromise the care and safety of the public (Batt et al., 2020).

Competency frameworks are commonly part of health professions and ensure the identification of abilities and competency-based standards needed for effective professional practice (Batt et al., 2020; Gonczi et al., 1990). In this model, a professional role/profile is constructed by describing required behavioral objectives in the form of knowledge, skills, attitudes, and other characteristics (KSAOs) for effective practice (Campion et al., 2011). Paramedic education and entry-to-practice requirements vary internationally. Degree-based education and professional regulation are established in several jurisdictions, while vocational, technical, and mixed pathways remain elsewhere (Makrides et al., 2022). In Australia, the United Kingdom and Ireland, paramedicine is a regulated health profession with registration, accreditation and defined professional standards or capabilities (Health & Care Professions Council, 2023; Paramedicine Board of Australia, 2020; Pre-Hospital Emergency Care Council, 2026). Other systems use different educational and credentialing models. These differences affect how entry-to-practice expectations are defined and assessed. The structure of KSAOs broadly reflects established domains of learning: the cognitive domain described by Bloom et al. (1956), the affective domain developed by Krathwohl et al. (1964), and the psychomotor domain, for which several taxonomies have been proposed, including those of Dave (1970), Harrow (1972), and Simpson (1972). The identification of KSAOs ensures healthcare professions are well defined, promotes competent workforces, facilitates assessment, facilitates professional mobility, and helps to analyze and evaluate the expertise of the profession and the professional (Campion et al., 2011; Epstein & Hundert, 2002; Gonczi et al., 1990). KSAOs in paramedicine should be informed by a holistic role description to avoid becoming too reductionist. Paramedic practice requires the performance of multiple competencies at once, which KSAO frameworks run the risk of not capturing.

Contemporary approaches to health care professional education have embraced the concept of competency-based medical education (Frank et al., 2010; Van Melle et al., 2019). While not necessarily the only approach, Heywood et al. (1992) describes many benefits of having a set of competencies that describe entry-level practice, and the specified performance standard to assess their attainment. Among these benefits, Heywood lists consistent recognition across jurisdictions, accreditation standards, articulation with overseas education and related occupations, open and equitable assessment, and progression within an industry (Heywood et al., 1992).

DEFINITION OF TERMS

In this review, entry-level refers to the point at which a trained paramedic is expected to practice without direct supervision (Tavares & Boet, 2016). Depending on the jurisdiction, this may follow graduation, registration, or credentialing, with scope of practice determined by the relevant regulatory or service framework. In this review the concept of competency or competence was defined as proficiency and accuracy in the ability to perform not only task-based technical procedures but also higher-order thinking and behavioral skills such as professionalism, judgment, clinical decision making, communication, ethical practice, collaboration, and leadership (Epstein & Hundert, 2002). For this review, competence is used as an umbrella term for the minimum expectations for safe and effective entry-to-practice (Epstein & Hundert, 2002). Across jurisdictions, these may be expressed as competencies, professional capabilities, standards of proficiency, scope-of-practice requirements, or other professional standards. The terms are not interchangeable but reflect differences in how paramedic practice is defined and regulated.

The purpose of this scoping review was to map and synthesize the nature of literature describing entry-to-practice competence in paramedicine, including professional expectations and approaches used to assess readiness for independent practice. It was not intended to propose a universal assessment framework or replace jurisdiction-specific professional standards, capabilities, or registration requirements.

METHODS

DESIGN

This scoping review was conducted using the framework described by Arksey and O'Malley (2005) with methodological refinements proposed by Levac et al. (2010) and guidance from the Joanna Briggs Institute Manual for Evidence Synthesis (Peters et al., 2020). Reporting followed the PRISMA Extension for Scoping Reviews (PRISMA-ScR). The protocol was registered with the Open Science Framework (<https://osf.io/m6h8c>).

RESEARCH QUESTION

"How is entry-to-practice competence in paramedicine described in the literature?"

IDENTIFY RELEVANT STUDIES

A structured search was conducted across MEDLINE, EMBASE, Scopus, and CINAHL, supplemented by searches of Google Scholar and greyLit.org. Additional literature was identified by hand searching the reference lists of included studies (Paez, 2017). The search strategy was developed using the Population–Concept–Context (PCC) framework, consistent with scoping review methodology (Peters et al., 2020).

Population (P): paramedics and jurisdictional equivalents (e.g., emergency medical technicians [EMTs] and emergency medical services [EMS] clinicians) practicing in the prehospital or out-of-hospital setting.

Concept (C): expected entry-to-practice competence, including competency frameworks, competency profiles, standards, scope-of-practice statements, graduate attributes, and competency assessment approaches used to determine readiness for independent practice.

Context (C): entry-level practice, defined as the point of graduation, initial registration, or first independent practice without direct supervision.

The optimized paramedic literature search filter by Olausson et al. (2017) was utilized. This validated filter was combined with keywords and subject headings relating to competence and competency (e.g., competence, competency, standards, capability, attribute, scope of practice) and entry-to-practice concepts (e.g., entry-level, graduate, newly qualified, novice).

All database and supplementary searches were completed on 1 January 2026. Citations were imported into Zotero, then uploaded to the web-based application Rayyan, where duplicates were removed prior to screening. For Google Scholar, predefined search strings were used and the first 200 results per string were screened (sorted by relevance), with the same eligibility criteria applied as for database records. For greyLit.org, keyword searches were undertaken and all returned items were screened (Rethlefsen et al., 2021).

ELIGIBILITY CRITERIA

The search was restricted to peer-reviewed publications in English (including literature reviews, qualitative, quantitative, and mixed-methods studies) published between 1 January 1996 and 1 January 2026. Editorials, opinion pieces, news stories, interviews, and non-English articles were excluded.

Studies were eligible if they included paramedics/EMTs and described expected entry-to-practice competence at the point of independent practice. This included competency frameworks, profiles, standards, scope statements, and approaches used to assess readiness for practice, such as workplace-based assessment tools, global rating scales and programmatic assessment. See Table 1.

PCC Element	Search Terms
Population (Paramedics/EMS clinicians)	Ambulances.sh OR Emergency Medical Technicians.sh OR Air Ambulances.sh OR Emergency Medical Services.sh OR paramedic*.tw OR paramedicine.tw OR EMT.tw OR EMS.tw OR prehospital.tw OR pre-hospital.tw OR out-of-hospital.tw OR first responder*.tw OR ambulance*.tw OR HEMS.tw
Concept (Entry-to-practice competence)	competenc* OR competence OR competency OR standards OR capability OR attributes OR scope of practice OR professional profile OR graduate attributes OR framework OR assessment OR workplace-based assessment OR global rating scale
Context (Entry-level / Independent practice)	entry-level OR entry level OR graduate OR newly qualified OR novice OR initial registration OR independent practice OR transition to practice

Table 1. Search strategy structured using PCC framework.

LIMITS APPLIED

- English language only
- Peer-reviewed literature
- Publication date: 1 January 1996 – 1 January 2026
- Excluded: editorials, opinion pieces, news articles, and single discrete clinical procedures

Entry-level was operationalized as new graduates, students at the point of graduation, initial registration, or the first year of independent practice, and studies were included if

the competency framework or assessment approach was intended to represent minimum competence at initial independent practice.

Studies limited to a single discrete clinical procedure or technical task (e.g., one intervention) or focused on specialist/advanced practice domains not intended for entry-level practitioners were excluded. Studies focused on continued competence, skill maintenance/erosion, or post-registration upskilling were excluded unless they explicitly defined entry-to-practice competence expectations.

TITLE AND ABSTRACT SCREENING

Two investigators independently screened titles and abstracts, and then independently assessed the full text of potentially eligible articles. Study selection involved an iterative process to refine screening rules. Disagreements were resolved through discussion until consensus was achieved.

EXPERT CONSULTATION

Three subject matter experts were invited to review the final included articles and provide additional references. No additional papers were suggested.

Charting the Data

Data were extracted using a standardized charting form including: author, year, country, setting, population/role label (paramedic/EMT), study design, how competence was defined, competency framework/domain structure and/or assessment approach, and extracted competency statements/domains.

CRITICAL APPRAISAL

Formal critical appraisal was not undertaken. As the purpose of the review was to map the extent, characteristics, and content of the literature, studies were not rated or weighted according to methodological quality.

SYNTHESIS

Findings were synthesized using descriptive mapping and an inductive thematic approach informed by Braun and Clarke (2006). This approach was used to identify recurring patterns across the competency statements, professional expectations and assessment constructs extracted from the included studies, rather than to generate themes from primary qualitative data. DP undertook the initial coding of the extracted material, with BW providing a second-reviewer check of the coding and developing domains. Coding was iterative, with related codes grouped and refined into broader domains, and differences in interpretation resolved through discussion and consensus. The final domains were reviewed against the extracted data for coherence and distinction, resulting in three domains:

- Desirable non-technical attributes and professionalism;
- Scope of practice;
- Assessment of competency.

A secondary domain was assigned where a study substantively addressed more than one domain, allowing cross-cutting content to be represented.

RESULTS

The four database searches (MEDLINE, EMBASE, Scopus, and CINAHL) identified 8,231 records. After 1,476 duplicates were removed, 6,755 records were screened, of which 6,653 were excluded. Of 102 reports sought for retrieval, three were not retrieved, leaving 99 full-text reports assessed for eligibility. Seventy-nine reports were excluded following full-text assessment, leaving 20 studies identified through the database searches. Supplementary searching of Google Scholar and greyLit.org identified 33 records, from which two additional eligible studies were included. Overall, 22 studies were included in the final synthesis. See Figure 1 for the PRISMA flow diagram (Page et al., 2021).

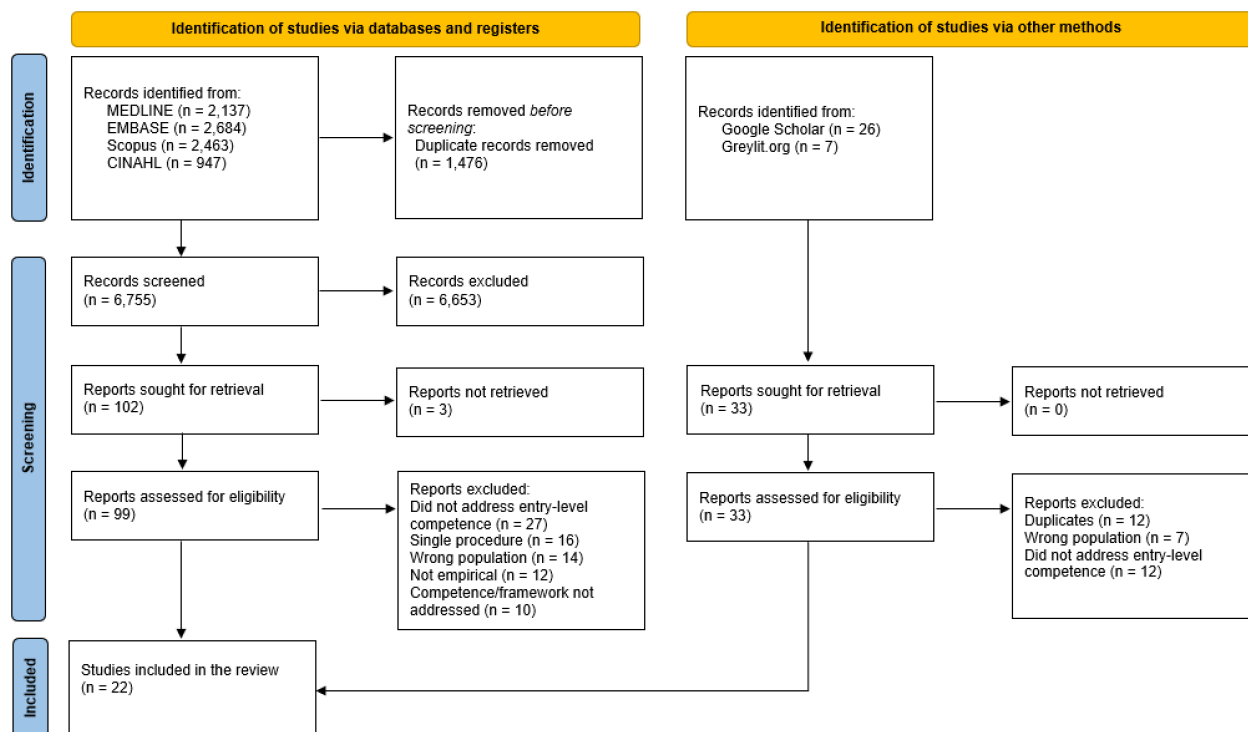


Figure 1. PRISMA flowchart.

CHARACTERISTICS OF INCLUDED STUDIES

This review found 22 relevant publications from five countries/jurisdictions. The majority of the studies were from Canada ($n=7$), followed by Australia ($n=6$), the United Kingdom ($n=5$), Saudi Arabia ($n=3$), and Taiwan ($n=1$). The methods used included reviews/scoping or systematic approaches ($n=9$), Delphi studies ($n=3$), factor analytic approaches ($n=3$), mixed-methods studies ($n=2$), qualitative or grounded-theory approaches ($n=2$), survey-based studies ($n=1$), data triangulation ($n=1$), systems-thinking ($n=1$), and competency framework development ($n=1$).

Studies were classified by primary domain as desirable non-technical attributes and professionalism ($n=11$), scope of practice ($n=7$), and assessment of competency ($n=4$). Secondary domains were recorded where studies substantively addressed more than one area. Across studies, competency-related content was derived using diverse approaches reflecting variation in how “entry-level competency” was operationalized internationally.

Table 2 summarizes included studies and key extracted elements. Literature also spans major changes in paramedic education and regulation. Earlier studies, particularly from Australia and the United Kingdom, reflect workforce and education systems that pre-date current registration and professional capability frameworks. They were retained to show how entry-to-practice expectations have developed over time but were interpreted within their historical context.

Author	Year	Country	Methods	Key Contribution	Domain(s)
AlShammari et al.	2018	Saudi Arabia	Scoping review	Synthesized international statements to propose core entry-level competencies and themes for Saudi paramedicine.	Desirable non-technical attributes and professionalism
AlShammari et al.	2019a	Saudi Arabia	Delphi study	Delphi consensus ranking of core competencies; emphasized legal/ethical practice, safety, respect, judgement, and clinical care.	Desirable non-technical attributes and professionalism
AlShammari et al.	2019b	Saudi Arabia	Confirmatory factor analysis	A CFA of the SPECS model confirmed five factors: professionalism, preparedness, communication, clinical, and personal.	Desirable non-technical attributes and professionalism Secondary Domain: Scope of practice
Bennett et al.	2021	Australia	Scoping review	Scoping review of paramedic NTS; found limited measurement/assessment despite emphasis on decision-making and communication.	Desirable non-technical attributes and professionalism Secondary Domain: Assessment of competency
Chang et al.	2018	Taiwan	Cross-sectional survey with principal component analysis	Surveyed EMT instructors and medical directors and used principal component analysis to derive core competency factors across Taiwanese EMT levels; also identified perceived gaps in training, licensure, and system development.	Desirable non-technical attributes and professionalism Secondary Domain: Scope of practice
Cooper	2005	United Kingdom	Qualitative interview-based study	Explored professional competence needs and CPD in a changing service context; raised concerns about assessment validity/reliability.	Desirable non-technical attributes and professionalism Secondary Domain: Assessment of competency
Kilner	2004	United Kingdom	Delphi study	UK Delphi of graduate attributes; identified high-priority professional/clinical attributes and curriculum gaps.	Desirable non-technical attributes and professionalism Secondary Domain: Scope of practice
Perona et al.	2019	Australia	Narrative literature review	Narrative synthesis of paramedic reasoning/decision-making; highlighted lack of global standardization and role variation.	Desirable non-technical attributes and professionalism Secondary Domain: Scope of practice
Shields & Flin	2013	United Kingdom	Narrative review	Reviewed paramedic non-technical skills; argued for behavioral taxonomies and rating systems (CRM domains).	Desirable non-technical attributes and professionalism
Tavares et al.	2016	Canada	Mixed-methods study	Mixed-methods derivation of Canadian paramedic roles; highlighted cross-cutting capabilities (e.g., safety, adaptability).	Desirable non-technical attributes and professionalism Secondary Domain: Scope of practice
Williams et al.	2010	Australia	Exploratory factor analysis	EFA of graduate attributes; identified key professionalism, reasoning and self-development factors for entry-level practice.	Desirable non-technical attributes and professionalism
Batt et al.	2025	Canada	Competency framework development	Developed a contemporary national competency framework for Canadian paramedics using a systems-informed, six-step development model and multiple qualitative and quantitative methods.	Scope of practice Secondary Domain: Assessment of competency

Table 2. Characteristics of included studies.

Author	Year	Country	Methods	Key Contribution	Domain(s)
Batt et al.	2024	Canada	Sys-tems-think-ing study	Mapped multi-level influences on practice to strengthen competency framework development and contextual fit.	Scope of practice
Bolster et al.	2022	Canada	Restricted literature review	Synthesized emerging competency-relevant concepts (e.g., equity, adaptive expertise, virtual care) to inform future frameworks.	Scope of practice
Weber et al.	2024b	Australia	Narrative literature review	Identified themes within professional capabilities; highlighted high-priority domains and gaps (e.g., self-directed practice).	Scope of practice
Bigham et al.	2013	Canada	Systematic review	Community paramedicine research to date is lacking, but programs in the United Kingdom, Australia, and Canada are perceived to be promising.	Scope of practice
Clements & Mackenzie	2005	United Kingdom	Review	Applied the UK CFEC to paramedics to support role definition, training design, and workforce development.	Scope of practice Secondary Domain: Assessment of competency
von Vopelius-Feldt & Bengner	2014	United Kingdom	Data triangulation study	Triangulated tasks/competencies across provider levels; informs scope definition and training for critical care practice.	Scope of practice
Salisbury et al.	2024	Canada	Survey-based study	Compared placement models; community placements supported competency achievement and may mitigate preceptor shortages.	Assessment of competency
Smith et al.	2020	Australia	Mixed-methods study	Evaluated APCAT placement tool; supported usability/alignment but identified need for assessor education and validation.	Assessment of competency
Smith et al.	2023	Australia	Grounded-theory study	Grounded theory of assessor judgements; highlighted context dependence and threats to reliability/validity of decisions.	Assessment of competency
Tavares & Boet	2016	Canada	Narrative review	Assessment theory synthesis proposing principles for defensible performance-based assessment and a paramedicine research agenda.	Assessment of competency

Table 2 (continued). Characteristics of included studies.

The most frequently cited paramedic competencies were consistently framed around the ability to think critically and make decisions, work independently and as a team, perform clinical skills, provide leadership and supervision, perform assessments (history taking and physical examination), adhere to ethical and legal practice, communicate effectively, demonstrate professionalism and trustworthiness, self-direct ongoing professional development, and integrate evidence-informed practice (AlShammari et al., 2018, 2019a, 2019b; Chang et al., 2018; Kilner, 2004; Tavares et al., 2016; Williams et al., 2010). More recent studies extended these competency expectations by explicitly incorporating systems thinking, evolving contexts of practice (e.g., community and non-traditional settings), and broader professional roles beyond emergency response (e.g., education, leadership, policy, public health, and research) (Batt et al., 2024, 2025; Bolster et al., 2022; Weber et al., 2024b).

Several included articles noted a transition in paramedic practice, shifting from technical skills used for treating life-threatening conditions, to a more holistic practice caring for a large variety of non-life-threatening conditions (Bigham et al., 2013; Clements & Mackenzie, 2005; Perona et al., 2019; Tavares et al., 2016). This transition was also reflected in newer Canadian and Australasian contributions describing contemporary roles and competencies that extend across emergency/primary care, community and system-facing

domains, and that emphasize context, equity, and adaptability alongside clinical competence (Batt et al., 2024, 2025; Bolster et al., 2022; Weber et al., 2024a). Changes in paramedic practice were also accompanied by increasing emphasis on university-based education and preparation for independent professional practice (Kilner, 2004; Tavares et al., 2016; Williams et al., 2010; Weber et al., 2024b). A trend is noted away from technical career training and moving towards university and higher education-based degree programs, thereby developing professionals who practice independently. Recent work also highlighted implications for competency achievement in alternative clinical placement models and persistent challenges in the reliability, validity, and consistency of competency assessment decisions (Salisbury et al., 2024; Smith et al., 2020, 2023; Tavares & Boet, 2016). In addition to summary characteristics, common themes were identified pertaining to paramedic competency among the included articles. Three domains emerged:

- Desirable non-technical attributes and professionalism;
- Scope of practice;
- Assessment of competency.

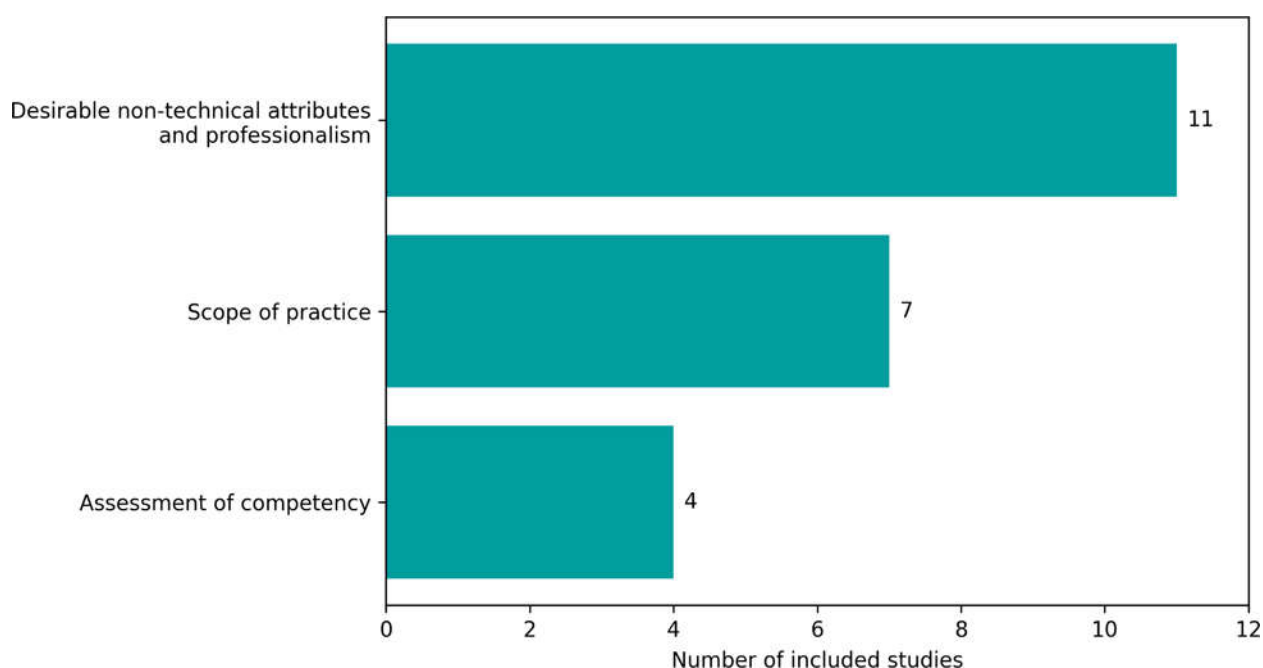


Figure 2. Frequency of primary competency domains across included studies ($n=22$).

Note: Frequency represents the primary domain assigned to each included study in Table 2; secondary domains are not included in these counts.

DESIRABLE NON-TECHNICAL ATTRIBUTES AND PROFESSIONALISM

Eleven studies examined non-technical and professional attributes expected of entry-level paramedics (AlShammari et al., 2018, 2019a, 2019b; Bennett et al., 2021; Chang et al., 2018; Cooper, 2005; Kilner, 2004; Perona et al., 2019; Shields & Flin, 2013; Tavares et al., 2016; Williams et al., 2010). Commonly identified attributes included ethical practice, professionalism, accountability, cultural sensitivity, communication, empathy, and responsibility for safe, high-quality care, alongside teamwork, leadership, situational awareness, and decision-making.

Several studies noted that non-technical skills had historically received limited curricular emphasis. Kilner (2004) highlighted gaps between highly rated attributes and existing curricula, while Williams et al. (2010) argued for empirically derived graduate attributes embedded within national standards, accreditation processes, and fitness-to-practice frameworks to support benchmarking and standardization.

Teamwork and leadership were also prominent non-technical competencies across the included literature. Serving as team members and team leaders was emphasized and explored in depth by Shields and Flin (2013), who identified seven papers focusing on elements of crew resource management, a communication and teamwork methodology that has been shown to reduce errors in aviation and health care (Shields & Flin, 2013; Verbeek-van Noord et al., 2015). Shields and Flin found that teamwork, leadership, situational awareness, decision making, and communication were encountered most frequently (Shields & Flin, 2013).

Williams et al. (2010) identified professionalism, clinical competence, communication, personal management, and self-directed learning as key graduate attributes for entry-level paramedics. Tavares et al. (2016) similarly noted that paramedics are social advocates for patients who practice in varied contexts as reflective and autonomous practitioners engaged in life-long learning. Continuing professional development, self-direction, and inter-professional communication were identified across six studies (AlShammari et al., 2019a, 2019b; Chang et al., 2018; Cooper, 2005; Kilner, 2004; Williams et al., 2010). Additionally, Chang et al. (2018) reported that training, licensing, working conditions, remuneration, and scope of practice were perceived as influencing professional performance.

SCOPE OF PRACTICE

Seven articles addressed scope of practice (Batt et al., 2024, 2025; Bigham et al., 2013; Bolster et al., 2022; Clements & Mackenzie, 2005; von Vopelius-Feldt & Benger, 2014; Weber et al., 2024a). Paramedics may be certified, licensed, registered, or credentialed at different levels according to jurisdictional requirements, responsibilities, and defined scope of practice. Scope may be shaped by permitted procedures, educational preparation, registration or certification requirements, and additional specialized competencies, as reflected in models across Taiwan, Canada, Ireland, Australia, the United Kingdom, and the United States (Chang et al., 2018; Health & Care Professions Council, 2023; National Association of State EMS Officials, 2021; Paramedic Association of Canada, 2024; Paramedicine Board of Australia, 2020; Pre-Hospital Emergency Care Council, 2026).

The definition of a paramedic has expanded to include assessment, treatment, and referral of non-emergent conditions, with the emergence of community paramedicine and mobile integrated health care (Ulintz et al., 2024; Williams et al., 2021). Bigham et al. (2013) reported that 30–50% of ambulance transports may be avoidable and described advances in alternative disposition pathways and roles in health promotion and injury prevention, themes echoed in subsequent work (AlShammari et al., 2019b; Chang et al., 2018; Tavares et al., 2016; Williams et al., 2021). More recent studies further characterize evolving paramedic roles in relation to professional capabilities, regulatory reform, accreditation expectations, and broader system-facing responsibilities across jurisdictions (Batt et al., 2024, 2025; Bolster et al., 2022; Ulintz et al., 2025; Weber et al., 2024a).

ASSESSMENT OF COMPETENCY

Four articles primarily addressed assessment of competency: Tavares and Boet (2016), Salisbury et al. (2024), and Smith et al. (2020, 2023). Together, these studies examined performance-based assessment, clinical placement assessment, assessment tools, and assessor decision-making in entry-to-practice contexts. Tavares and Boet (2016) reviewed theoretically informed approaches to performance-based assessment in paramedicine. They conceptualized competence as developing across knowledge, skills and abilities, and argued that assessment should discriminate between levels of performance, support defensible achievement decisions and provide meaningful evidence about future clinical performance in new contexts. They also noted the limited paramedic-specific evidence base, with much of the available research focused on isolated technical or non-technical skills or specific patient populations.

Tavares and Boet (2016) also discussed Miller's pyramid, which conceptualizes assessment across four levels: "knows," "knows how," "shows how," and "does". They argued that competence is best assessed in contexts that approximate the settings in which future clinical performance is expected. Rather than relying on a single assessment method, their review emphasized multiple observations and sources of evidence to improve the accuracy and defensibility of decisions about competence.

The conceptual and theoretical approaches discussed by Tavares and Boet (2016), including Miller's pyramid, Kane's conceptualization of competence, generalizability and reliability, validity, and multiple sampling—provide a basis for strengthening summative entry-to-practice assessment in paramedicine. They also identified emerging areas including programmatic assessment, the appropriate use of assessor judgment and narrative information, and a better understanding of how raters make decisions. Recent included studies extend these concerns by emphasizing assessor judgment, the context dependence of competence decisions, and the need for defensible assessment systems that support consistent decisions across varied placement environments (Salisbury et al., 2024; Smith et al., 2020, 2023).

DISCUSSION

This scoping review synthesized 22 publications to clarify how entry-level paramedic competence has been conceptualized, operationalized, and assessed across diverse international contexts. Competency-based education requires a comprehensive description of the abilities needed to enter a profession (Frank, 2005; Frank et al., 2010). Given the changes underway in paramedicine internationally, an updated synthesis of the evidence informing entry-level paramedic competency is warranted. Across the included studies, three domains emerged: desirable non-technical attributes and professionalism; scope of practice; and assessment of competency.

Notably, attributes that would appear fundamental to paramedic practice were not universally articulated. For example, AlShammari et al. (2019a) identified coping skills in stressful situations as a core competency; however, coping and resilience were infrequently operationalized across other studies, despite the high-acuity and unpredictable environments in which paramedics practice (National EMS Management Association, 2017). Similarly, domains such as communication, accountability, record keeping, and ongoing professional development were variably represented across frameworks and

studies (Kilner, 2004; Williams et al., 2010). In the updated literature, non-technical professionalism and adaptability remained prominent, but the inconsistent specification of wellbeing, coping, and resilience suggests persistent gaps in how frameworks define and justify “core” entry-level requirements (AlShammari et al., 2019b).

Variation was also observed even where study designs were similar. Both Chang et al. (2018) and AlShammari et al. (2019b) used factor analytic approaches grounded in earlier empirically derived attributes (Kilner, 2004; Williams et al., 2010), yet their “top” competency factors differed in emphasis. Chang et al. (2018) prioritized clinical competence and professionalism, patient-centered practice, continuing professional development, self-management and safety, and clinical reasoning; AlShammari et al. (2019b) emphasized effective clinical care, professional and legal boundaries, safety procedures, respectful practice, and teamwork. Such differences likely reflect local educational pathways, regulation and credentialing expectations, and service models, and reinforce the importance of contextualizing competency profiles rather than assuming universal equivalence (Batt et al., 2024, 2025). Temporal context is also important. Earlier studies captured paramedicine during periods of considerable educational and professional transition, whereas more recent literature increasingly reflects degree-based preparation, professional regulation, and capability-based standards. Accordingly, similarities across studies should not be interpreted as evidence that entry-to-practice expectations, regulatory structures, or workforce models have remained unchanged over time. At the same time, there is increasing convergence at the level of high-order domains: professionalism, communication, clinical reasoning, patient assessment, and teamwork, even where operational detail differs across jurisdictions (Perona et al., 2019). Jurisdictional context similarly limits direct comparison. The included studies represent different health systems, educational pathways, credentialing arrangements, and stages of professional regulation, ranging from registered professional workforces to systems with more varied credentialing pathways. Consequently, terms such as entry-level, independent practice, and scope of practice may represent different expectations across jurisdictions. The findings should therefore be interpreted as mapping common and divergent entry-to-practice expectations rather than defining equivalent professional roles internationally.

This pattern aligns with broader critiques of competency framework development. Batt et al. (2020) identified substantial variability in how frameworks are constructed, raising concerns about their validity and utility when derived predominantly from local expert consensus processes without robust empirical triangulation. The present review supports this concern, with newly included studies demonstrating continued differences in how competency domains are defined, derived, and mapped to regulatory or accreditation requirements (Batt et al., 2025; Bolster et al., 2022; Weber et al., 2024b). Collectively, the evidence suggests partial alignment in high-level expectations but continued absence of a globally standardized, empirically unified entry-level competency framework for paramedicine (Perona et al., 2019). Professional regulation also changes how entry-to-practice expectations are operationalized. In regulated systems, professional capabilities or standards inform curriculum accreditation and expectations for registration, rather than functioning simply as lists of discrete competencies. This distinction is important when comparing studies across jurisdictions, particularly where educational preparation, credentialing and regulatory oversight differ.

Teamwork and team leadership were prominent across included studies and are central to paramedic practice, particularly as roles expand into more complex, system-facing models of care (Shields & Flin, 2013). Although some relevant teamwork/crew resource management work was excluded because of its focus on a single competency domain, it reinforces the need for clearer specification and assessment of teamwork, communication, situational awareness, and leadership behaviors (Shields & Flin, 2013). As paramedicine increasingly interfaces with multidisciplinary care pathways, these domains warrant explicit articulation and defensible assessment, rather than implicit assumptions that they are embedded within broader constructs such as “professionalism” or “critical thinking” (Shields & Flin, 2013).

Assessment remains a key challenge for competency-based education implementation in paramedicine. A lack of consensus on standards for assessing competence has been reported internationally (Michau et al., 2009; O’Meara et al., 2014, 2015; Westgard et al., 2013; Williams & Teese, 2016). One-off evaluations often under simulated or constrained conditions may not translate to consistent real-world performance (Tavares & Boet, 2016). The broader assessment literature emphasizes that defensible decisions require appropriate sampling and multiple observations across contexts, and that competence is a temporary state requiring ongoing maintenance (Epstein & Hundert, 2002; Tavares & Boet, 2016). These concerns are amplified in out-of-hospital care where settings, patient presentations, volumes, and acuity vary widely, complicating reliable workplace-based assessment (Crossley & Jolly, 2012). The evidence reinforces that assessor judgments and placement-based decisions are highly context dependent, supporting the need for clear standards, rater development, and repeated observation across placements and clinical contexts to underpin defensible entry-to-practice decisions (McAllister et al., 2025; Tavares & Boet, 2016).

Other regulated health professions have addressed similar issues using profession-specific workplace assessment tools linked to professional standards or capabilities. Examples include the Assessment of Physiotherapy Practice (APP), Australian Nursing Standards Assessment Tool (ANSAT), Australian Midwifery Standards Assessment Tool (AMSAT), and Competency Assessment in Speech Pathology (COMPASS) (Dalton et al., 2011; McAllister et al., 2010; Ossenberrg et al., 2016; Sweet et al., 2020). These tools show how professional standards can be translated into structured assessment in practice and may offer useful guidance for paramedicine.

Finally, while non-technical competence was strongly represented, clinical competence remained essential across included studies. Nevertheless, the literature rarely provided comprehensive lists of clinical tasks or interventions, and there was limited linkage between entry-to-practice standards and procedures with demonstrated outcome impact (Batt et al., 2025; Weber et al., 2024b). Given contemporary scope expansion and increasing expectations for autonomous decision making, stronger integration is needed between high-impact clinical interventions, broader competency domains (e.g., assessment and reasoning), and assessment strategies (Batt et al., 2025; Weber et al., 2024b). Without clearer empirical linkage, educators and regulators risk maintaining entry standards that are either reductionist or insufficiently aligned with contemporary prehospital practice (Batt et al., 2024).

FUTURE DIRECTIONS

Two areas warrant further research: how entry-to-practice expectations are defined across different regulatory and educational systems, and how readiness for independent practice should be assessed. Recent studies have added to the evidence on assessor judgment and workplace-based assessment, but well-validated approaches remain limited. Future work should compare where jurisdiction-specific standards and capabilities align or differ, rather than pursue a single universal framework. Assessment studies should also examine reliability, validity, and feasibility across placement models, including how much evidence is needed, from what settings, and with what level of assessor preparation.

LIMITATIONS

Despite attempts to be comprehensive, not all relevant studies may have been identified. While a validated paramedic search filter was utilized, the terms paramedic and paramedicine do not have a standardized international nomenclature. Some countries utilize specialized nurses, physicians, or other practitioners with similar training, scope, and competency profiles. For example, Dutch and Brazilian studies employing methods similar to those of Chang et al. (2018) and AlShammari et al. (2019b) described competencies for ambulance nurses (Gentil et al., 2008; Van Schuppen & Bierens, 2011). These articles were excluded because they did not specifically name paramedics, although the findings were broadly consistent with this review. As formal critical appraisal was not undertaken, this review does not determine the methodological robustness of individual studies or weight findings according to study quality.

Although gray literature searching was undertaken, sources such as Google Scholar have inherent reproducibility limitations, and some relevant documents may not be consistently retrievable across time or users (Rethlefsen et al., 2021). Moreover, limited reporting in some studies restricted detailed synthesis. For example, von Vopelius-Feldt and Benger (2014) listed 389 distinct skills identified through direct observation; however, the complete list was not published and could not be included. Finally, heterogeneity in methodologies and contextual differences between countries may affect generalizability and complicate direct comparison, particularly where competence was conceptualized as discrete competencies, broader capability domains, scope-of-practice expectations, or assessment decision processes. The broad publication period also spans substantial changes in paramedic education and regulation; consequently, findings from earlier studies may not fully reflect contemporary entry-to-practice expectations in regulated professional systems.

CONCLUSION

This scoping review identified three domains in the expected competency of entry-level paramedics: desirable non-technical attributes and professionalism; scope of practice; and assessment of competency. Future research should examine how jurisdiction-specific entry-to-practice standards and capabilities can be translated into assessment approaches that are measurable, feasible, and defensible within their educational, regulatory, and clinical contexts.

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