

RESEARCH REPORTS

LOW-ACUITY CARE IN AUSTRALIAN UNDERGRADUATE PARAMEDICINE LEARNING OUTCOMES

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ABSTRACT

Introduction: Low-acuity presentations constitute a substantial proportion of ambulance caseload in Australia. Although emergency care is central to paramedicine education, graduates must also be prepared to assess and make non-conveyance decisions for this patient group. In Australia, undergraduate programs provide the foundation for entry into paramedicine. However, little is known about how low-acuity care is represented within curricula, particularly through subject unit learning outcomes (LOs).

Methods: An exploratory document analysis was conducted utilizing publicly available LOs and unit descriptions from Australian undergraduate programs. LOs were examined and categorized as 'explicit', 'implied', 'mixed', 'ambiguous' or 'nil' for both low- and high-acuity content. LOs were categorized as explicit where they directly referred to acuity-related terminology, such as non-emergency, primary care, time-critical, or acute. LOs were categorized as implied where acuity was suggested through context, and as ambiguous where reference to acuity was uncertain.

Results: Fifteen undergraduate programs were included with 1,770 LOs analyzed. Of these, 207 were determined to refer to low-acuity care with 23 categorized as explicit, 16 as implied, 68 as mixed, and 100 as ambiguous. In contrast, 485 LOs referred to high-acuity care with 234 categorized as explicit, 165 as implied, 68 as mixed, and 18 as ambiguous. When explicit and implied categories were combined, 39 of 1,770 LOs referred to low-acuity care, compared with 399 for high-acuity care.

Discussion: The findings of this study suggest considerable heterogeneity across LOs, particularly in how low-acuity care is represented compared to high-acuity. This may limit the articulation of expected graduate capabilities in assessment, management, and non-conveyance decision-making for patients requesting ambulance care for low-acuity conditions.

Conclusion: Greater representation of low-acuity care in undergraduate paramedicine program LOs may support closer alignment between graduate preparedness for practice and contemporary ambulance service demand. These findings may inform future curricula design in low-acuity care.

INTRODUCTION

Emergency medical service (EMS) attendance to low-acuity conditions has increased over the past two to three decades, contributing to a substantial volume of ambulance caseload in

Australia and internationally (Andrew et al., 2020; Booker et al., 2015; Eastwood et al., 2016; Lowthian et al., 2011; Productivity Commission, 2025). As a result, paramedics in many EMS systems around the world are no longer defined solely by emergency response and transport to hospital (O'Cathain et al., 2018). They are increasingly being recognized as mobile healthcare professionals, who are required to manage a broad range of needs, including low-acuity and chronic presentations that may be appropriately addressed within the community setting (Booker et al., 2015; Eastwood et al., 2019; Eaton et al., 2021). Accordingly, managing low-acuity cases and avoiding unnecessary conveyance to an emergency department (ED) has become integral to contemporary paramedic practice within Australia and comparable EMS systems internationally (Blodgett et al., 2021; Eastwood et al., 2018; Ebben et al., 2019; Heinonen et al., 2022; Lederman et al., 2020; Oosterwold et al., 2018).

Currently, there is no universally accepted definition of low-acuity with the term often used alongside descriptors such as non-urgent, non-emergency, non-acute, non-serious, non-conveyance, or primary care suitable (Binks et al., 2021; Dinh et al., 2016; Thompson et al., 2011). Definitions of low-acuity cases have been described as vague and subjective, with prior work highlighting the need for clearer descriptors (Binks et al., 2021; Stephens & Broome, 2017). For the purposes of this study, low-acuity refers to patient presentations that, following paramedic assessment, are clinically stable and non-time-critical, with a low risk of deterioration, and do not require emergency paramedic intervention or conveyance to an ED. These presentations are generally suitable for management within the community, including on-scene paramedic care, self-care advice, referral to a primary care physician or another appropriate healthcare service (Andrew et al., 2020; Carter et al., 2025; Eastwood et al., 2018; Wilkinson-Stokes et al., 2024). Examples of presentations that may fall within this definition include minor injuries, musculoskeletal sprains and strains, self-limiting gastrointestinal symptoms, ear, nose and throat conditions, dental concerns, mild skin or allergic conditions, common upper respiratory tract infections, and psychosocial concerns (Ambulance Tasmania, 2017; Berry et al., 2024; Dinh et al., 2016; Eastwood et al., 2019; Halter et al., 2011; Vella et al., 2022). This definition is not intended to imply that low-acuity presentations are always risk-free or straightforward, as they can involve clinical and psychosocial complexity, diagnostic uncertainty, and have the potential for deterioration.

With over 50% of calls for ambulance assistance in Australia not categorized as an emergency, ambulance services have introduced several strategies to manage the increasing low-acuity demand (Eastwood et al., 2016; Wilkinson-Stokes et al., 2024; Wilkinson-Stokes et al., 2025). These include secondary telephone triage, non-conveyance or 'treat and refer' guidelines for paramedics, and specialist roles such as extended care paramedics (ECP), community paramedics (CP), or paramedic practitioners (Eastwood et al., 2015; Shannon et al., 2023; Snooks et al., 2004; Wilkinson-Stokes et al., 2025). Despite the success of these strategies, low-acuity presentations remain a routine part of the caseload for generalist paramedics working on emergency ambulances (Eastwood et al., 2019). However, previous research has indicated that paramedics often feel underprepared to manage some low-acuity conditions, particularly where additional patient assessment skills or higher levels of clinical reasoning are required (Carnicelli et al., 2024).

A contributing factor to this appears to be insufficient education and training provided to paramedics to support the development of additional skills and clinical reasoning

(Carnicelli et al., 2024; Johansson et al., 2022; Lederman et al., 2019; Vella et al., 2024). Where ambulance services have provided training programs to support the introduction of non-conveyance guidelines or decision-making tools, their impact on non-conveyance was generally minimal (Carnicelli et al., 2024). This was often due to the variability in the duration and content of these programs, resulting in paramedics feeling they provided limited assistance to support assessment and decision-making (Carnicelli et al., 2024). In comparison, post-graduate education provided to train paramedics as ECPs or CPs, has been positively associated with improving patient assessment skills and non-conveyance decisions (Carnicelli et al., 2024). However, while this level of education may be essential for entry into specialist roles, it is not required for all low-acuity cases and it would be impractical to expect all paramedics undertake such training (Carnicelli et al., 2024; Hobbs et al., 2021; Wankhade, 2016). Thus, there remains questions around the educational preparation necessary to support low-acuity practice for generalist paramedics, including the required level, the type of content, and where it is positioned along the educational spectrum. Considering the benefits and limitations of in-service and post-graduate training, it would seem that undergraduate education may provide an important avenue to provide the foundations of low-acuity practice, especially given they are the main entry pathway into paramedicine in Australia and comparable systems around the world (Eaton, 2023; Hickson et al., 2015).

In the Australian context, entry to practice and subsequent employment with one of the eight state or territory-based ambulance services generally requires the completion of an undergraduate (bachelor) degree. These programs are delivered by several universities nationwide and must comply with accreditation standards set by the Paramedicine Board of Australia (PBA) (Paramedicine Board of Australia, 2020). Additionally, programs must address the PBA's professional capabilities, including the ability to manage "the full range of patient presentations and circumstances" (Paramedicine Board of Australia, 2021). Although these standards establish a regulatory framework for accreditation and quality assurance, they do not prescribe a standardized curriculum (Paramedicine Board of Australia, 2021; Smith et al., 2023; Weber et al., 2025b; Weber et al., 2021). As a result, each university determines its own program structure, subject units, learning outcomes, content, assessments, and clinical placement requirements (Smith et al., 2023; Weber et al., 2025b; Weber et al., 2021). Although variation exists between individual programs, their curricula appear to be predominantly emergency care focused (O'Meara et al., 2017; Weber et al., 2025a, 2025b). In contrast, primary care content, which is closely aligned with low-acuity practice, represents just over seven percent of curricula (Weber et al., 2025a). This limited focus on non-emergency practice has been recognized by undergraduate students, who have described a disconnect between the predominance of high-acuity education compared to the volume of low-acuity cases they encounter during emergency ambulance placement (Devenish, 2014; Thompson, 2020).

Considering that a substantial proportion of paramedic caseload involves low-acuity presentations, undergraduate curricula may be increasingly required to prepare graduates for a broader range of non-emergency healthcare needs. However, this should not come at the expense of emergency content that is central to the paramedic role and its professional identity. The educational challenge, therefore, is how to retain this focus while also ensuring graduates develop the knowledge and capabilities required to appropriately assess and manage low-acuity patients; while ensuring they gain a consistent baseline

level of education across the various programs. This has been a noted concern in other content areas of undergraduate paramedicine in Australia (Parent et al., 2020; Peasey et al., 2025).

Currently, limited research has examined how preparation for low-acuity practice is articulated within Australian undergraduate paramedicine education. Subject unit learning outcomes (LOs) provide one means to explore this, as they describe the knowledge, understanding, and capabilities that learners are expected to demonstrate at the end of a period of learning; as well as guide educators in curriculum design, assessment, and program quality assurance (Adam, 2008; Adams, 2015; Hadjianastasis, 2017). Examining LOs may therefore offer insight into how low-acuity care is represented within entry-to-practice curricula. Thus, this study aimed to explore how low-acuity content is represented in subject unit LOs within Australian undergraduate paramedicine programs. For this study, representation referred to the extent to which low-acuity care was present, visible, and identifiable within LOs. Further, given the limited research examining low-acuity care within undergraduate curricula, this study was exploratory in nature.

The following questions guided the research:

1. How do unit LOs represent low-acuity knowledge, skills, and practice?
2. What is the relative volume and distribution of LOs referring to low-acuity content compared with high-acuity content across programs?
3. What terminology is used within unit LOs to describe low-acuity clinical practice?

METHODS

RESEARCH APPROACH

This study utilized directed qualitative content analysis to examine publicly available unit LOs from Australian undergraduate paramedicine programs (Hsieh & Shannon, 2005). Content analysis is a systematic method for analyzing the structure and meaning of text within its context and is well suited to curriculum document analysis (Bowen, 2009; Dalglish et al., 2020; Krippendorff, 2018). The analysis was guided by a pre-defined conceptual distinction between low- and high-acuity practice as informed by the literature. This shaped the development of search terms, identification of relevant LOs, and the categorization framework. While primarily deductive, the process remained iterative, with terms and category application refined through repeated reading, comparison, and moderation. This aligned with a reflexive approach to the process, allowing for the adaptation of categories as the text was analyzed (Elo & Kyngäs, 2008; Hsieh & Shannon, 2005; Morgan, 2022). Further, a pragmatic ontological and epistemological approach informed the research, with LOs treated as curriculum artifacts that provided useful, but partial insight into how programs represent expected low-acuity learning. Accordingly, the analysis of LOs aimed to produce findings that were practically relevant for future curriculum development (Schreier, 2012).

For this analysis, low-acuity was classified according to the definition provided in the introduction and how it was represented and contextualized within unit LOs and descriptions. This included references to clinically stable, non-urgent, non-emergency, primary or community-based care, non-conveyance, referral pathways, and other alternatives to ED care. High-acuity content generally referred to life-threatening, time-critical, acute or

emergency illness and injury requiring urgent paramedic intervention to prevent deterioration or death (Ibsen et al., 2021; Kayambankadzanja et al., 2022). This classification was used as an analytic distinction rather than a fixed clinical dichotomy, as acuity is a dynamic concept where clinical risk may evolve over time and presentations initially appearing as low-acuity, may require escalation of care including conveyance to an ED.

RESEARCH SETTING

At the time of data collection in June 2024, 18 out of 42 Australian universities offered a total of 25 pre-registration paramedicine degree programs (Australian Health Practitioner Regulation Agency and National Boards, 2024). Eligible programs were standalone undergraduate bachelor-level degrees leading to registration as a paramedic with the PBA. Superseded, graduate entry, and combined degree programs (e.g. paramedicine and nursing) were excluded as they could influence the analysis with content that is not usually included in undergraduate curricula, such as nursing units specific to primary healthcare, child and adolescent health, or community care.

SOURCES OF DATA

For this study, the terms 'program', 'unit', and 'learning outcome' were adapted from Fennell et al. (Fennell et al., 2025). A program referred to an undergraduate degree leading to the conferral of a bachelor-level qualification in paramedicine. A unit referred to an individual component of study within a program, often referred to as a subject. LOs referred to statements outlining what students are expected to achieve at the completion of an individual unit and how understanding is to be demonstrated. Curriculum data were sourced from publicly available university websites and included (where available), course overviews, program structure (year and semester), program unit descriptions and their LOs.

DATA EXTRACTION

Eligible undergraduate degrees were identified through the PBA's publicly available online list of accredited programs and screened against the inclusion criteria. Included programs were then accessed through their respective university's homepage. Course webpages were accessed, checked and re-checked, with all publicly available curriculum information extracted into a structured Excel™ (Microsoft Corporation, USA) spreadsheet, which was piloted and refined as required. Curriculum artifacts from each university program were extracted and transferred verbatim into separate spreadsheets. Extracted data included course overview, program structure, and all program units, which were separated into their year and semester of study. Data extraction and charting was conducted by the first author and checked by the second. Only core program units were extracted to ensure comparability across programs. Elective units were excluded as they were not consistently available in all programs and are usually units of study outside the main curriculum.

After extraction, curriculum artifacts were repeatedly read and re-read to identify low- and high-acuity terms and synonyms. Terms were guided by the analytical distinction between low- and high-acuity care as previously described and by how low-acuity is represented in the literature (Allana & Pinto, 2021; Ambulance Tasmania, 2017; Booker et al., 2015; Carnicelli et al., 2024; Eastwood et al., 2019; Mills et al., 2023; Wilkinson-Stokes

et al., 2024). Search terms were iteratively refined following initial screening and re-reading, resulting in the generation of two separate word lists containing both explicit and implicit low- and high-acuity terms (Table 1 and 2). In this analysis, some terms were classified according to their contextual meaning. For example, the term ‘urgent care’ was treated as a community-based service-model that provides a primary care alternative to attending an ED for non-life-threatening conditions (Carter et al., 2025). In comparison, the term ‘urgent’ was treated as a high-acuity descriptor, as it is often used to refer to acute conditions that may deteriorate without a timely response or intervention (Ambulance Tasmania, 2017; Forero & Nugus, 2012). The first two authors independently conducted the word searches and compared findings, with any differences resolved by discussion or moderation with the third author if required. Where there was uncertainty if a unit or LOs should be included in the analysis, unit descriptions were consulted to provide additional context.

Low-Acuity Word Terms
"primary care" OR "primary healthcare" OR "primary health" OR "urgent care" OR "community paramedicine" OR "community paramedic" OR "non emergency" OR non-emergency OR non-complicated OR non-urgent OR "non urgent" OR sub-acute OR "low acuity" OR low-acuity OR "lower acuity" OR non-acute OR GP OR "general practice" OR referral OR "alternative care pathways" OR "alternative treatment pathways" OR "alternate management pathways" OR "alternative pathways" OR "inter-disciplinary care pathways" OR "health care pathways" OR "complementary management pathways" OR "extended care" OR "extended scope" OR "community healthcare"
Additional terms added
Extended scope, complementary pathways, collaborative pathways, collaborating agencies, interdisciplinary care pathways, discharge planning, other related health setting, community practice.
High-Acuity Word Terms
emergency OR emergencies OR emergent OR "emergency care" OR "emergency management" OR acute OR urgent OR high-acuity OR "high acuity" OR resuscitation OR "basic life support" OR "intermediate life support" OR "advanced life support" OR life-threatening OR "life threatening" OR "life threat" OR "critical care" OR "critical conditions" OR "critical situations" OR "critical illness" OR "critically ill" OR "critically injured" OR "critical injury" OR "critical injuries" OR "time critical" OR "serious injury" OR "serious illness" OR multi-trauma OR "multi trauma" OR "first aid" OR "mass casualty" OR "multi-casualty" OR "major incident" OR "major incidents" OR disaster
Additional terms added
Cardiac arrest, advanced care, emergent, defibrillation, external cardiac compressions, serious injury or illness, peri-arrest, deteriorating patient, altered conscious state, post-arrested patient, advanced cardiac life support, shock, time criticality.

Table 1. Low- and high-acuity search terms.

Extracted LOs were categorized as explicit, implied, mixed, ambiguous, or nil according to the presence and framing of acuity-related terms (Table 2 and 3). These categories were adapted from the work of Murray-Parahi et al., who examined primary healthcare content within undergraduate nursing curricula (Murray-Parahi et al., 2020). In the present study, the structural classification was retained, while category definitions were refined to reflect acuity distinctions within the paramedicine context. Once the categories and their definitions were agreed to and finalized, the LOs underwent several rounds of categorization and re-categorization, to strengthen the consistency and trustworthiness of the analysis (Krippendorff, 2018). Further, LOs were not categorized in isolation, with the information in each unit including LO wording, unit title, and unit description carefully examined to determine whether they referred to a low- and/or high-acuity context.

The process of categorization was conducted independently by two members of the research team (first and second authors), before meeting to compare decisions and resolve

Category	Description
LA-E	LO contains explicit (E) reference to low-acuity content defined by the presence of a low-acuity term(s); or there was direct reference to low-acuity content within the context of the LO and/or the unit description and/or the unit title.
LA-I	The reference to low-acuity content in the LO was implied (I) through context, setting, or phrasing but was not explicit in the LO and/or the unit description and/or the unit title.
Mixed	LO contains a mix of either explicit and/or implied low- and high-acuity content; Or the LO was, or appeared to be, referring to both low- and high-acuity content, within the context of the LO and/or the unit description and/or the unit title.
LA-A	Presence of low-acuity content in the LO was ambiguous (A) as the reference was either vague, weak, or uncertain, either within context of the LO and/or the unit description and/or the unit title.
Nil	LO did not mention or did not refer to low-acuity content or term(s), and/or appeared unrelated to low-acuity content within the context of the LO and/or the unit description and/or the unit title.

Table 2. Low-acuity category definitions.

Category	Description
HA-E	LO contains explicit (E) reference to high-acuity content defined by the presence of a high-acuity term(s); or there was direct reference to high-acuity content within the context of the LO and/or the unit description and/or the unit title.
HA-I	The reference to high-acuity content in the LO was implied (I) through context, setting, or phrasing but was not explicit in the LO and/or the unit description and/or the unit title.
Mixed	LO contains a mix of either explicit and/or implied high- and low-acuity content; Or the LO was, or appeared to be, referring to both high- and low-acuity content, within the context of the LO and/or the unit description and/or the unit title.
HA-A	Presence of high-acuity content in the LO was ambiguous (A) as the reference was either vague, weak, or uncertain, either within context of the LO and/or the unit description and/or the unit title.
Nil	LO did not mention or did not refer to high-acuity content or term(s), and/or appeared unrelated to high-acuity content within the context of the LO and/or the unit description and/or the unit title.

Table 3. How-acuity category definitions.

any discrepancies. Where uncertainty remained, moderation was undertaken with the third author who was independent from the process. Ensuring one researcher remained independent allowed for further investigator triangulation, strengthening the credibility, reliability, and confirmability of the categories, as they challenged interpretations, assumptions, and any potential biases of the primary coders (Lincoln & Guba, 1985; Noble & Heale, 2019; Schreier, 2012). Comments were recorded as text during categorization to justify decisions, support reflexivity, and enable coding audit.

ETHICS STATEMENT

Ethics approval was not required for this study as it did not involve human or animal research. Curriculum information was accessed from open and publicly available websites. All university data including names of institutions, program titles and units have been deidentified. The study is also part of an approved PhD program for the first author.

RESULTS

OVERVIEW OF PROGRAMS AND LOS

A total of 25 pre-registration paramedicine programs were screened, with 15 standalone undergraduate bachelor programs included for analysis (Figure 1). Across these programs, 1,770 LOs from 384 units were analyzed. Of these, 1,206 (68%) LOs were located in units containing references to low- or high-acuity content and were included in the categorization process. The remaining 564 (32%) LOs were not categorized as they were

located in units with no identified acuity-related content such as those specific to the human biosciences, research, professionalism, or health service management.

Across the full dataset of 1,770 LOs, explicit or implied reference to low-acuity care was limited. Thirty-nine LOs, representing 2.2% of all the LOs analyzed, were categorized as low-acuity explicit or implied. In comparison, 399 LOs representing 22.5% of all the LOs analyzed, were categorized as high-acuity explicit or implied. High-acuity care was identifiable at approximately ten times the frequency of low-acuity care. The numerical breakdown of low- and high-acuity LO categories across universities is presented in Tables 4 and 5, with the corresponding distributions graphically represented in Figures 2 and 3.

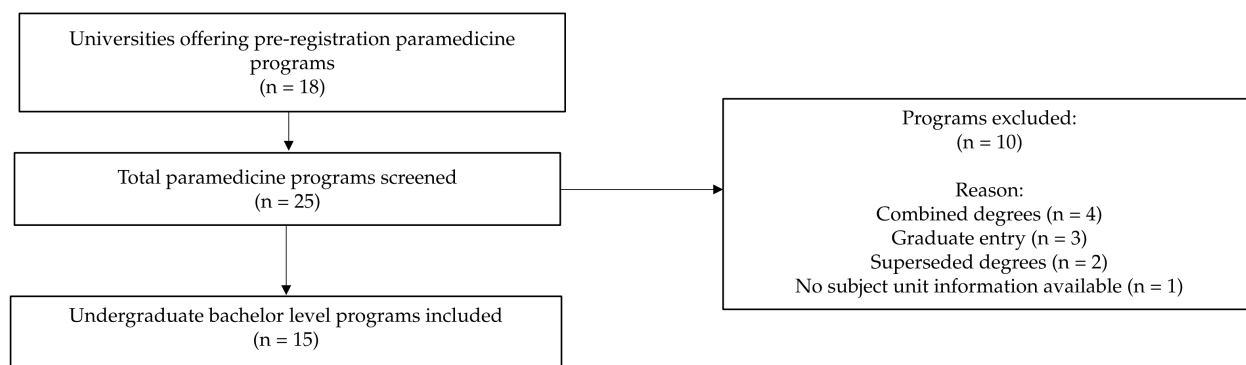


Figure 1. Program screening and inclusion.

LOW-ACUITY LEARNING OUTCOMES

Of the 1,770 LOs analyzed, 207 LOs were identified as referring to low-acuity content. These included 23 categorized as explicit, 16 as implied, 68 as mixed, and 100 as ambiguous. A further 199 LOs were found to have no reference to low-acuity care (Table 4). Low-acuity LOs were distributed across 88 units, representing 23% of the 384 units examined. The distribution of these units varied across the 15 programs, with six programs containing less than five units, eight programs between five and 10 units, and one program with more than 10 units (range: 2-12).

Explicit low-acuity LOs were found in 10 of the 88 identified units. Six of these units were located in the final year of their respective programs, three were located in the first year, and one in the second year. Implied low-acuity LOs were identified in 11 units, while mixed and ambiguous LOs were distributed across 45 and 46 units respectively.

Across the included programs, seven of the 15 contained units primarily or mostly dedicated to low-acuity care such as primary care, extended care, or community paramedicine. One university frequently used the term 'primary healthcare' across various elements of its program. However, no LOs within this program were categorized as low-acuity explicit.

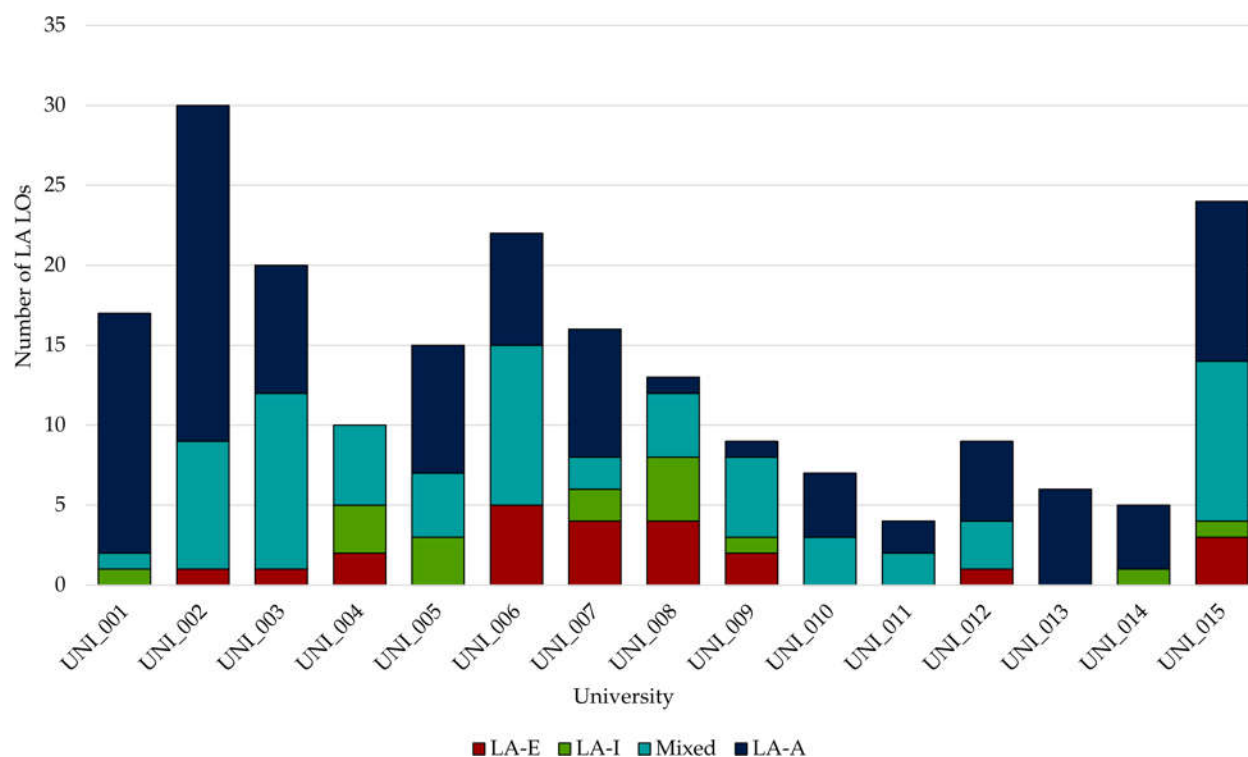


Figure 2. Number and type of LOs categorized as low-acuity by university.

Abbreviations: LA-E=low-acuity explicit LO; LA-I=low-acuity implied LO; mixed=mixed low- & high- acuity LO; LA-A = low-acuity ambiguous LO.

University	Number of LA-E LOs	Number of LA-I LOs	Number of Mixed LOs	Number of LA-A LOs	Total LA LOs
UNI_001	0	1	1	15	17
UNI_002	1	0	8	21	30
UNI_003	1	0	11	8	20
UNI_004	2	3	5	0	10
UNI_005	0	3	4	8	15
UNI_006	5	0	10	7	22
UNI_007	4	2	2	8	16
UNI_008	4	4	4	1	13
UNI_009	2	1	5	1	9
UNI_010	0	0	3	4	7
UNI_011	0	0	2	2	4
UNI_012	1	0	3	5	9
UNI_013	0	0	0	6	6
UNI_014	0	1	0	4	5
UNI_015	3	1	10	10	24
Total	23	16	68	100	207

Table 4. Low-acuity category definitions.

Abbreviations: LA-E=low-acuity explicit LO; LA-I=low-acuity implied LO; mixed=mixed low- & high- acuity LO; LA-A = low-acuity ambiguous LO.

HIGH-ACUITY LEARNING OUTCOMES

Of the same 1,770 LOs analyzed, 485 were identified as referring to high-acuity content. These included 234 LOs categorized as explicit, 165 as implied, 68 as mixed, and 18 as ambiguous (Table 5). A further 315 LOs were categorized as having no reference to high-acuity care. High-acuity LOs were distributed across a total of 160 units, representing 41.7% of all 384 units analyzed. The distribution of these units varied across the 15 programs, with four programs containing less than 5 units, nine programs between five and 10 units, and two programs with more than 10 units (range: 1-14).

Explicit high-acuity LOs were found in 97 of the 160 identified units. Twenty-one of these were located in the first year of their respective programs, 43 in the second year, and 33 in the final year. Implied high-acuity LOs were identified in 80 units, while mixed and ambiguous LOs were distributed across 45 and 15 units respectively.

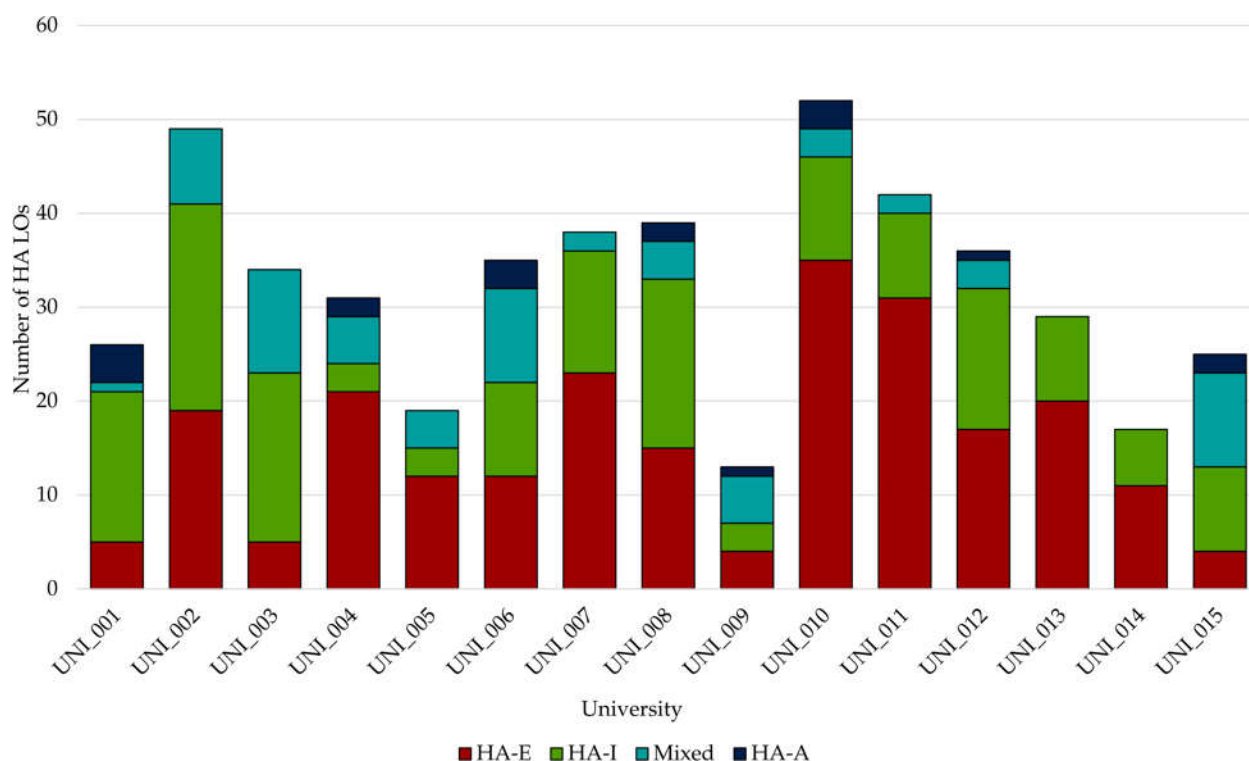


Figure 3. Number and type of LOs categorized as high-acuity by university.

Abbreviations: HA-E=high-acuity explicit LO; HA-I=high-acuity implied LO; mixed = mixed high- & low- acuity LO; HA-A=high-acuity ambiguous LO.

DISCUSSION

This study explored how low-acuity care was represented within publicly available LOs from Australian undergraduate paramedicine programs. The findings suggest considerable variation in the volume, distribution, clarity, and terminology used to refer to low-acuity in unit LOs. As our study was limited to analyzing the specific content of LOs and unit descriptions, which only represent one component of curriculum design, it does not allow for conclusions to be drawn regarding the actual low-acuity content that may be delivered through teaching and assessment practices within these programs.

University	Number of HA-E LOs	Number of HA-I LOs	Number of Mixed LOs	Number of HA-A LOs	Total HA LOs
UNI_001	5	16	1	4	26
UNI_002	19	22	8	0	49
UNI_003	5	18	11	0	34
UNI_004	21	3	5	2	31
UNI_005	12	3	4	0	19
UNI_006	12	10	10	3	35
UNI_007	23	13	2	0	38
UNI_008	15	18	4	2	39
UNI_009	4	3	5	1	13
UNI_010	35	11	3	3	52
UNI_011	31	9	2	0	42
UNI_012	17	15	3	1	36
UNI_013	20	9	0	0	29
UNI_014	11	6	0	0	17
UNI_015	4	9	10	2	25
Total	234	165	68	18	485

Table 5. Number of LOs coded as high-acuity by university.

Abbreviations: HA-E=high-acuity explicit LO; HA-I=high-acuity implied LO; mixed = mixed high- & low- acuity LO; HA-A=high-acuity ambiguous LO.

VOLUME OF LOW- AND HIGH-ACUITY LEARNING OUTCOMES

This analysis revealed that LOs representing high-acuity concepts were considerably more common, with 399 categorized as high-acuity explicit or implied compared to 39 for low-acuity. This tenfold difference suggests that undergraduate curricula continue to frame paramedicine mostly through a high-acuity lens, which is consistent with previous research into Australian programs (Weber et al., 2025a). The focus on high-acuity teaching is not unexpected, as strong educational preparation to manage life-threatening and emergency conditions is central to the role of a paramedic. However, where the representation of low-acuity practice is variable or limited, it may be challenging to demonstrate that graduates from different programs are equally prepared to assess low-acuity presentations and determine whether non-conveyance is safe and appropriate (Halter et al., 2011; Sheffield et al., 2016; Thompson, 2013; Vella et al., 2024). Previous research has identified variability in curriculum content across Australian undergraduate programs, suggesting that graduates may enter professional practice with differing levels of preparation (Parent et al., 2020; Peasey et al., 2025; Weber et al., 2025b). Therefore, clearer articulation of low-acuity care within LOs may support improved curriculum alignment with patient assessment, risk stratification, safety-netting, and decision-making skills required of contemporary paramedics.

University programs in Australia have responded to the changing landscape of paramedicine by including low-acuity content. This is evidenced within the extracted curricula artifacts with several programs offering specific units in extended care or community paramedicine, as well as clinical placement time in primary care settings (Eaton, 2023; Weber et al., 2025a, 2025b). However, it has been remarked that despite these inclusions, there has been little change since the beginning of professional registration in 2018, with the integration of this content remaining largely insufficient (Weber et al., 2025b). Based on previous research and our analysis of LOs, low-acuity practice appears to be under-represented within Australian undergraduate programs, despite the recog-

dition that a substantial and increasing proportion of emergency ambulance caseload is low-acuity in nature.

DISTRIBUTION AND REPRESENTATION OF LOW-ACUITY PRACTICE WITHIN LEARNING OUTCOMES

Low-acuity content appeared to be distributed across programs in two main ways: through dedicated units, often titled as extended care or community paramedicine, or within broader units alongside high-acuity topics. In other units, even where the unit description indicated a focus on low-acuity care, there was mixing with high-acuity topics. For example, in one program, a low-acuity unit also included emergency birth and birth complications, as well as newborn resuscitation. In other programs, community paramedicine and low-acuity care were integrated with topics such as advanced life support, toxicology, general acute conditions, trauma, traumatic cardiac arrest, and shock. The combination of this content may reflect that patient presentations can shift along an acuity spectrum and that conditions initially appearing or assessed as low-acuity, have the potential to deteriorate or require escalation in care. This may help students develop an appreciation of the potentially complex nature of some low-acuity presentations, which is especially important for certain patient populations and conditions that may have poorer outcomes if this is under-recognized. However, where content is combined without articulation within LOs, intended low-acuity learning may be overshadowed by the larger volume of high-acuity content. It is also possible that the mixing of content may represent a means of consolidating topics to accommodate new areas of practice as they emerge. A potential consequence of this is overcrowding the curricula, especially where there may be competing demands to include new content, which is a recognized challenge within other university programs (Begley et al., 2025; Dalley et al., 2008; Disanayake et al., 2024; Slavin & D'Eon, 2021).

The variation observed across programs also raises questions about whether broader curriculum guidance could support more consistent representation of low-acuity learning and ensure a common baseline of educational preparation (Parent et al., 2020; Weber et al., 2025b). Australian paramedicine programs must align with accreditation standards and professional capability frameworks; however, these do not prescribe recommended curriculum content. Previous research has suggested that a national curriculum may be one potential solution to address the known variability across programs (Parent et al., 2020; Peasey et al., 2025; Weber et al., 2025b). This could include a set of exemplar LOs to support the scaffolding of all areas of practice across the individual programs, including low-acuity care, while preserving institutional autonomy and local program design (Peasey et al., 2025).

CLARITY OF LEARNING OUTCOMES

A key challenge encountered and reflected on in this analysis was interpreting the intended meaning of the LOs. A large proportion of low-acuity LOs were categorized as ambiguous (n=100), often because their reference to low-acuity remained uncertain, even after repeated review and moderation. This ambiguity commonly reflected broad and generic clinical wording, including references to holistic approaches, patient care activities, advanced medical presentations, and complex medical etiologies. Similar ambiguity occurred where units titled as emergency care focused also included chronic disease management. The term 'chronic' appeared, in some instances, to be used as a

possible surrogate for low-acuity without being clearly articulated. In contrast, explicit low-acuity categorization was supported by direct references to primary care, non-acute or non-emergency presentations, discharge planning, and referral to community or alternative healthcare services. Additionally, implied low-acuity categorization was suggested through context and included references to person-centered care, biopsychosocial models, and lifespan healthcare. The use of broad or inconsistently applied curriculum language is not unique to low-acuity care, with similar issues reported in relation to other content areas within Australian paramedicine curricula, including pediatrics and mental health (Parent et al., 2020; Peasey et al., 2025).

The high proportion of ambiguous LOs should also be interpreted in light of the differences in institutional reporting practices. Australian universities independently determine the structure, wording, and level of detail they provide in their publicly available program information. Consequently, some programs may present LOs in more detailed clinical terms, whereas others may use broader statements in which low-acuity care is embedded rather than explicitly stated. This variability may have affected the categorization of LOs and limited direct comparisons between programs. Thus, ambiguous language in LOs may reflect limitations in public curriculum documentation rather than an absence of certainty in their low-acuity content. However, from a representation perspective, this ambiguity is important, as content not clearly visible within LOs may be less identifiable to current and prospective students, which may potentially diminish its perceived relevance to professional preparation.

Ambiguously framed LOs can also make it challenging for students and educators to determine their purpose, expected depth of learning, capabilities to be acquired, and how they link to assessment (Brooks et al., 2014; Guilbert, 2002; Hadianastasis, 2017; Kennedy, 2006; Schoepp, 2019). It has been remarked that poorly constructed LOs can lead to their misinterpretation, which risks rendering them irrelevant and of no real practical use (Sin, 2014; Sweetman, 2019). While ambiguity can have pedagogical value, particularly when preparing students for increasing clinical complexity and uncertainty, it should be purposeful rather than the result of unclear framing (Kennedy, 2006; Purvis & Winwood, 2023). For low-acuity care, clearer articulation may provide a greater appreciation for the fact that certain presentations can be challenging, requiring thorough patient assessment and sound clinical decision-making, rather than potentially being viewed as a distraction from “real” high-acuity work (Simpson et al., 2017). It should be noted that this detail may be present in the actual delivered content of the programs including lectures and tutorials. However, this was not the focus of the present study and may be an area for future research. The prevalence of ambiguous low-acuity LOs also highlights the potential difficulty of articulating curriculum intent in this area. However, it is generally recommended that LOs should be a direct reflection of the knowledge and capabilities that students are expected to develop in preparation for clinical practice.

LEARNING OUTCOME TERMINOLOGY

Terminology used to describe low-acuity care varied across and within programs. Terms included ‘low-acuity’, ‘lower acuity’, ‘non-emergency’, ‘non-acute’, ‘non-urgent’, ‘sub-acute’, ‘primary care’, ‘non-complex’, and ‘non-complicated’. While these terms may appear similar, they are not necessarily interchangeable, which was noted to occur in some programs. In particular, terms such as ‘non-complex’ or ‘non-complicated’ risk

conflating urgency with complexity, which could reinforce previously reported negative perceptions of low-acuity presentations (Simpson et al., 2017). Referral terminology also varied, with programs using phrases such as 'other appropriate health services', 'alternative management pathways', 'alternative or complementary management pathways', 'referral pathways', 'collaborative pathways' and 'interdisciplinary care pathways'. Lastly, similar variation was noted in the terminology used for specialist areas of practice including, 'community paramedicine', 'extended community paramedicine' and 'extended paramedic care'. Greater uniformity of terminology may reduce inconsistency in how low-acuity practice is represented across curricula and within the profession.

LIMITATIONS

One of the main limitations of our study is that it only explored curriculum content from publicly available online sources. As a result, our findings reflect the representation and framing of low-acuity care within the published materials, which do not provide the full view of the actual delivered content, including teaching methods, assessment tasks, or practical learning experiences. It should also be acknowledged that the information provided varied between universities, with some publishing more unit detail compared to others, which may influence the context in which some LOs were categorized. The researchers did not seek or have access to the full curriculum content of each program, which may have provided further context and clarity to our findings, especially for LOs that were categorized as ambiguous. However, such curriculum information is usually unavailable as it is the intellectual property of the respective universities and rarely made public (Murray-Parahi et al., 2020). Additionally, publicly available information may also be less detailed compared to the content provided on internal learning management systems that is available to enrolled students. This represents an area for further research, including surveys and/or interviews with paramedicine educators and students to provide clarity and context around the integration and teaching of low-acuity content.

Ambiguous LOs also posed a challenge for their interpretation and subsequent categorization, as wording did not always clearly indicate how the representation of low-acuity content was intended. Unit descriptions were used to provide additional context where uncertainty was encountered, but these only provide a brief synopsis of the unit content. While this study did not examine the full content of each program, LOs provide valuable insight into the intended areas of focus, as they directly reflect the knowledge and skills that unit and program structures are built on. In turn, these are then utilized by students to guide their interpretation of course learning priorities and ultimately how they are assessed.

A further limitation is that the curriculum artifacts examined in this study were sourced at a single point in time and program coordinators were not contacted to verify the currency of the LOs published on their webpages. As a result, during this study, universities may have made internal changes and revisions to their curricula, including LOs and content that was not publicly available at the time. It is not uncommon for programs to update their course information prior to the beginning of each new academic year, as well as engage in periodic comprehensive course review (Tertiary Education Quality and Standards Agency, 2024).

CONCLUSION

This analysis of publicly available LOs across Australian undergraduate paramedicine programs revealed considerable heterogeneity in how expected learning for low-acuity care is represented. While some programs have incorporated clearly defined low-acuity units and LOs, others represented low-acuity concepts briefly or through broad and ambiguous phrasing. These findings highlight an opportunity to review future curriculum development, including recommendations for greater representation of low-acuity care within programs, clearer articulation of baseline low-acuity capabilities that are aligned across programs, and consistent terminology for low-acuity care and community practice. The observed variation across programs also raises questions about whether broader educational policy and national guidance regarding curricula development and content may be beneficial.

Further research could also examine how low-acuity care is developed, delivered, assessed and experienced both within undergraduate programs and through professional practice. In particular, qualitative research exploring how university education, workplace learning, and clinical experience have shaped paramedic preparedness for low-acuity practice could provide useful insight for the development of capabilities required for current and future practice. This may extend the findings of the present study beyond the visible curriculum represented in publicly available information. Finally, while this study explored Australian undergraduate programs, the findings may be relevant to comparable EMS systems around the world that are also experiencing increased low-acuity demand, and where paramedics or ambulance clinicians in those systems are required to possess similar entry-to-practice education.

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