

REVIEWS

BACHELOR'S DEGREE AS ENTRY-TO-PRACTICE: A LITERATURE REVIEW OF PARAMEDICINE AND OTHER HEALTH PROFESSIONS

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Recommended Citation: Rimstad, C., Kayanja, J., Newman, S., & Violato, E. (2025). Bachelor's degree as entry-to-practice: A literature review of paramedicine and other health professions. *International Journal of Paramedicine*. (13). 120-132. <https://doi.org/10.56068/HRSG6460>. Retrieved from <https://internationaljournalofparamedicine.com/index.php/ijop/article/view/3528>

Keywords: diploma, transition, degree, allied health, professional education, emergency medical services, EMS, paramedicine

Disclosures: The authors report there are no competing interests to declare. During the preparation of this work, the authors used ChatGPT to locate and summarize relevant articles during the literature retrieval stage of the paper. After using this artificial intelligence (AI) tool, the authors reviewed and edited the content as needed. The authors take full responsibility for the content of this paper

Funding: Not applicable.

Received: October 1, 2025

Revised: October 20, 2025

Accepted: October 20, 2025

Published: January 13, 2026

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ABSTRACT

Background: The evolving scope of paramedicine has prompted debate regarding the suitability of diploma programs as entry-to-practice, with increasing attention on transitioning to bachelor's degree qualifications. Other health professions have undergone similar shifts, offering valuable insights for paramedicine.

Objective: To examine the reported outcomes of transitioning from diploma- to degree-level entry-to-practice in paramedicine and comparable health professions.

Methods: A narrative literature review was conducted in July 2025 using four academic databases and hand searches. Elements of the PRISMA framework were adapted to illustrate the search and screening process. As the review was a narrative review no risk of bias assessment tool was used. Inclusion criteria were full text academic articles on degree transition published from 1980-2025; exclusion criteria were non-English, non-peer reviewed, and non-healthcare professions. Eighteen peer-reviewed articles met inclusion criteria, encompassing nursing, dental hygiene, respiratory therapy, and paramedicine. Data were extracted and thematically analyzed to identify positive and negative impacts of degree-level entry.

Results: Positive outcomes included enhanced patient care, expanded career opportunities, improved cognitive and clinical competencies, and strengthened interpersonal attributes. Reported drawbacks included increased financial and geographic barriers, extended program duration, and perceptions of limited necessity for practice. Paramedicine-specific literature was scarce, though evidence from nursing and dental hygiene indicated significant professional and clinical advantages.

Conclusions: Transitioning to bachelor's degree entry-to-practice offers potential benefits for paramedicine but may also restrict accessibility and exacerbate workforce challenges. Policymakers and educators should balance these factors, drawing on international and cross-disciplinary experiences, before adopting degree-based entry requirements.

INTRODUCTION

Over the past several years, paramedics have grown rapidly within their professional scope and responsibilities. What began as a soldier transport system has matured into a professional career that provides lifesaving emergency medicine (Makrides et al., 2022), while adjusting to aging populations, chronic con-

ditions, and technological advancements (O'Meara et al., 2017). A common concern in paramedicine is that advancements in the field have not only reached but surpassed the educational needs that can be addressed through a traditional diploma. One response to this rapid development is transitioning entry-to-practice education to a bachelor's degree (Egnatovich, 2022; O'Meara et al., 2017).

Countries such as Australia, New Zealand, and the United Kingdom have implemented higher paramedic education and observed benefits for both students and the profession overall (Brooks et al., 2018). Beyond paramedicine, other healthcare disciplines such as respiratory therapy (Becker & Nguyen, 2014), dental hygiene (DeRosa et al., 2021; Reid et al., 2021; Sunell et al., 2017), and nursing and midwifery (Jinks, 1994; Roets et al., 2016; Swindells & Willmott, 2003) have also explored the transition to support their growing scope and expectations. By transitioning from the traditional diploma, paramedic students could develop deeper theoretical knowledge and cognitive skills to enhance patient care and practical skills (Egnatovich, 2022). As Canadian and American associations for paramedicine call for and begin exploring the transition to degree programs (Caffrey et al., 2019), it is necessary to understand outcomes from countries and professions where the transition to a degree program has occurred. By examining findings from other countries and professions, Canadian and American paramedic groups, from colleges to schools, can make better-informed decisions about transitioning and prepare for potential outcomes that may occur post-transition.

A literature review was conducted to examine the available academic literature on the transition to a bachelor's degree program from other credentials, such as diplomas, certificates, and lower-level degrees, to inform policymakers, institutions, educators, and the paramedic profession in general about how paramedicine may be affected.

METHODS

REVIEW APPROACH

The present study employs a literature review, an approach that seeks consolidation, summation, or synthesis of existing publications to identify what is known about a topic without necessarily including formal quality appraisal, exhaustive searching, and which is typically presented narratively (Grant & Booth, 2009). Narrative literature reviews are particularly appropriate for synthesizing evidence in fragmented or emerging fields where conceptual clarity is needed (Snyder, 2019). The literature review method was selected over more structured methods, such as a scoping or systematic review, for two reasons: 1) Inclusion; based on the narrow scope of the topic (degree transition) and subject (paramedicine), it was expected that much evidence exists outside higher levels of the "hierarchy of evidence." More stringent methods risk excluding relevant literature (Murad et al., 2016). 2) Utility; the review aims to gather information about the educational implications of transitioning to a degree program, rather than evaluate the effectiveness of an intervention. As such, formal critical appraisal may exclude relevant literature and descriptive and contextual insights relevant to informing educators, policy makers, and stakeholders about the decision to transition.

SEARCH STRATEGY

A preliminary search of the literature was performed to develop key terms, leading to the inclusion of various professions in the search. The final search terms were based on plain-text keywords and Boolean operators (AND, OR). No controlled vocabulary (e.g., MeSH or CINAHL headings) was used. Table 1 presents the search terms and Boolean combinations used; all searches were performed on all databases. Database searches were conducted in: Medline (Ovid), CINAHL, PubMed, and Wiley Online Library in July 2025. Searches were limited to English-language, peer-reviewed, full-text journal articles published between 1980 and 2025. For searches returning more than 400 results, a practical screening limitation based on relevance saturation was set where the first 200 results were screened in chronological order. PubMed was not included in search 4 due to the retrieval of more than 2 million records. A review of references from selected articles, a hand search, and artificial intelligence, specifically ChatGPT (OpenAI, 2025), was also used to search for additional literature after the initial screening. ChatGPT was used after initial database screening to identify additional potentially relevant articles by suggesting titles or journals. All citations were managed using Zotero (Corporation for Digital Scholarship, 2025), which was also used for de-duplication. Ethics approval was not required for this study.

INCLUSION/EXCLUSION CRITERIA

Inclusion criteria: academic articles addressing the transition to higher education in healthcare professions, full-text articles, and an article publication date range from 1980 to 2025. Exclusion criteria: non-English articles, articles not concerning healthcare professions, and articles that were not scholarly or peer reviewed were excluded (e.g., editorials, commentaries).

EXTRACTION

Elements of the PRISMA framework were adapted to illustrate the search and screening process (Moher et al., 2009). Figure 1 presents the PRISMA flow diagram showing the number of records identified, screened, excluded, and included in the final synthesis. Three authors (CR, SN, JK) independently screened all identified articles' titles and abstracts for inclusion before comparing selected articles for retrieval and eligibility based on inclusion/exclusion criteria to determine a final set of articles for review. After the final selection of articles for review, three authors (CR, SN, JK) independently read articles to extract findings and themes, before engaging in an iterative review process with all authors to identify a final set of primary and sub-themes.

Because this was a narrative review, no formal critical appraisal tool (e.g., CASP or JBI) was applied. However, quality and potential bias were addressed through inclusion criteria and screening procedures. Only peer-reviewed, scholarly articles were included, and non-research or editorial pieces were excluded. Studies lacking sufficient methodological detail or providing weak or anecdotal evidence were categorized as "poor evidence" and excluded during screening. The review team also considered factors such as study design, sample size, and clarity of reporting when assessing the quality of included studies.

RESULTS

Eighteen articles were selected for review. The number of articles per profession was dental hygiene = 7, nursing = 7, paramedicine = 3, and respiratory therapy = 1. Two primary themes were developed: positive and negative effects of implementing a degree program. Positive effects were subdivided into four themes: improved patient care, improved career opportunities, improved cognitive and clinical practice, and personal and relational attributes. The negative aspects were subdivided into inaccessibility and a lack of necessity.

POSITIVE OUTCOMES

IMPROVED PATIENT CARE

Patient outcomes and care were heavily discussed in the nursing literature. Several studies found a relationship between a greater proportion of baccalaureate-prepared nurses in hospitals and reduced “failure to rescue,” patient mortality rates, re-admissions, and length of stay (Aiken et al., 2003; Lasater et al., 2021; Melnyk et al., 2015; Simpson et al., 2012). One study on surgical nurses found that a 10% organizational increase in employment of higher degree nurses resulted in a 5% decrease in “failure to rescue” and mortality rates (Aiken et al., 2003). Another review found that nurses holding bachelor’s degrees had more highly developed skills, such as professionalism, leadership, and critical thinking, which enhanced patient satisfaction and outcomes (Lane & Kohlenberg, 2010). One paramedic study found that advanced education was perceived to improve interpersonal “soft skills,” potentially enhancing patient experience and operational efficiency (Egnatovich, 2022).

IMPROVED COGNITIVE SKILLS AND CLINICAL PRACTICE

The improvement of cognitive abilities was identified throughout the literature as a key reason to transition to a bachelor’s degree education (Egnatovich, 2022). A study of sixteen dental hygienists in Canada who had achieved diplomas before pursuing bachelor’s degrees found participants reported growth of critical thinking, evidence-based decision-making, comprehensive care skills, and an increase in ability to use research in practice after completing their bachelor’s degrees (Kanji et al., 2011). Confidence in critiquing research increased with exposure to scientific literature during the degree program, which facilitated communication with patients and more readily making informed practice decisions (Snyder, 2019). The same study found 86% of students agreed that bachelor’s degree-level education leads to increased knowledge, and 85% agreed that critical thinking and research use are increased due to a bachelor’s degree educa-

Search	Terms
1	bachelor's degree OR baccalaureate degree AND paramedicine AND effects AND associate degree
2	dental hygiene AND baccalaureate OR diploma AND associate degree AND education
3	respiratory therapy AND baccalaureate AND associate degree AND education
4	nursing AND baccalaureate AND associate degree AND education OR educational

Table 1. Search terms used.

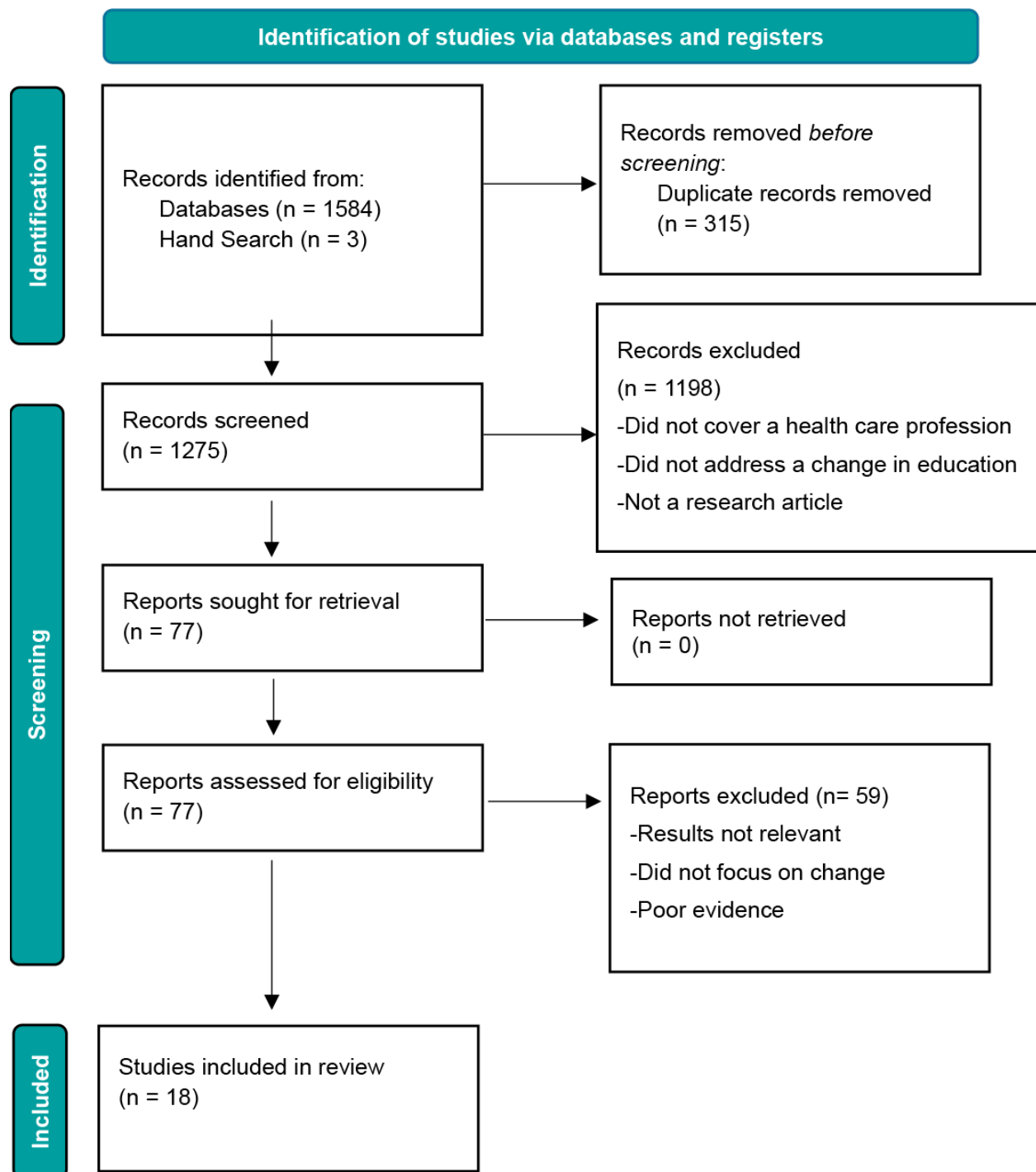


Figure 1. PRISMA diagram for literature search.

tion. Sixty-nine percent indicated that increasing their critical thinking skills was a factor in choosing a degree program over a diploma, while 83% stated wanting to increase their knowledge base contributed to their decision to pursue bachelor's degrees (Snyder, 2019).

A cross-sectional survey of nursing and midwifery graduates (completed an academic program) and diplomates (board-certified) in England (n = 448) assessed the differences between the graduates and diplomates using a measure of 42 different cognitive skills

and qualities (Swindells & Willmott, 2003). Skills assessed included problem-solving, evaluating care approaches, accountability, leadership, and teamwork. Of the 42 items, graduates scored significantly higher than diplomates on 21. Evidence-based practice (EBP) is using the most recent and relevant research with clinical skills and experience to improve patient care (Melnyk et al., 2015). In a survey of paramedics in Australia (n = 892) Simpson et al. (2012) found that 98% of respondents supported integrating EBP in practice, with higher support among those with a bachelor's degree (Simpson et al., 2012). The increased perceived value of and support for EBP was also linked to viewing research as important in paramedicine. The same survey showed that 97% of respondents viewed research as important in paramedicine, while 98% said they would change their practice based on research. Conversely, longer-serving paramedics were less likely to value research and the importance of participating in research. While most of the literature supported the advancement of cognitive abilities and skills, this theme was challenged in other research that found no differences in the cognitive abilities of diplomates and graduates (Clinton et al., 2005).

PERSONAL AND RELATIONAL ATTRIBUTES

Interpersonal competencies emerged as a ubiquitous theme in literature. Bachelor's degree-prepared nurses scored significantly higher on networking and collaboration, adaptability, accountability, and teamwork compared to diploma-prepared nurses (Swindells & Willmott, 2003). Among diploma dental hygienists who completed a bachelor's degree, the most prominent change was increased self-perception of confidence and credibility (Kanji et al., 2011). Additional research with dental hygienists found that knowledge obtained from a bachelor's degree increased self-confidence, which was associated with improved ability, decision-making, and action-taking (Sunell et al., 2017). Literature for paramedicine was limited; however, one New Zealand study investigating anxiety among paramedic students found that those whose highest previous education was a diploma program had significantly higher anxiety than those with degree qualifications (Wills & Asbury, 2019).

IMPROVED CAREER OPPORTUNITIES

Career mobilization may become easier with higher levels of education in a desired profession. In dental hygiene, increased access to career opportunities was a key theme identified across several studies, with broader career opportunities in academia and research motivating students considering a bachelor's degree (Benbow & Kanji, 2019; Kanji et al., 2011; Kanji & Laronde, 2018). Students who completed their dental hygienist degree identified enhanced skill in retrieving scientific information (Kanji & Laronde, 2018). Bachelor's degree dental hygienists were more likely to practice or work outside the traditional clinical setting, such as public health and community practice. A study of 5 first-year Bachelor of Dental Science student cohorts (n = 127) in British Columbia found that 82% of students chose a degree program rather than a diploma due to access to broader career opportunities (Katyal & Kanji, 2021). A survey of dental hygiene students (n = 401) found that 75% of students counted expanded access to career opportunities and a better capacity to work with underserved groups as a motivating factor in pursuing a degree program rather than a diploma (Benbow & Kanji, 2019). Higher education has also been linked to greater access to leadership roles, higher salaries, and more advanced professional roles. Becker and Nguyen (2014) found that respiratory therapists with a bachelor's

degree (n = 3139) at entry-to-practice were more likely to have roles as educators (12%) and leaders (40%) than those with associate degrees (Becker & Nguyen, 2014).

NEGATIVE OUTCOMES

INACCESSIBILITY

Across several healthcare disciplines, recurring critiques regarding the accessibility of higher education and how secondary factors impact individuals' decisions to pursue specific career paths emerged. One study investigating dental hygiene students' attitudes towards bachelor's degrees and factors that affected program choice identified three major concerns in choosing the program: proximity to the institution (74%), costs (68%), and time to completion (47.7%) (Reid et al., 2021). Proximity concerns have also been observed in nursing (Haron et al., 2014). Lack of time and finances is also a hindrance; in a survey of 61 nurses, 28 associate degree nurses indicated lack of time and finances as a reason for not pursuing a bachelor's degree despite seeing value in higher education (Thielmann et al., 2019). Lower socio-economic status (SES) individuals were less likely to complete a bachelor's degree compared to higher SES individuals and were more likely to base educational choices on available financial aid rather than credential type (Becker & Nguyen, 2014).

LACK OF NECESSITY

The perspective of bachelor's degree education as unnecessary for practice emerged relatively frequently in the literature. Research with nursing students found that though bachelor's degrees are perceived as beneficial, alternative pathways are viewed as sufficient for entry to practice (Thielmann et al., 2019). Similarly, a 2021 survey of 384 dental hygiene students found 73.7% of respondents felt an associate degree was sufficient for entry to practice (Reid et al., 2021). Practicing dental hygienists also felt their associate degree adequately prepared them to practice (Anderson & Smith, 2009). A survey of Pennsylvania diploma and associate degree nursing students found that even if the state nursing board was to mandate a BSN degree within 10 years post qualification, 78.9% would still have enrolled in their current program, indicating they consider their educational level sufficient (Maneval & Teeter, 2010). A study in England assessed the competencies of 166 graduate and 188 diplomate nurses using a modified version of the Nursing Competencies Questionnaire and found almost no differences in competency between the two groups (Clinton et al., 2005). The authors argue that there is no difference in skills or competencies between diplomates and graduates and that attaining higher education is not a direct cause of improvement in practice. It has also been argued that higher education in paramedicine is only necessary for specialized practice, like community or flight paramedics (Caffrey et al., 2019).

Research has found that transitioning to higher education can impact workplace professionalism due to disparities between experiential learning and theoretical knowledge. A UK study investigating the effects of transitions to higher education in paramedicine found substantial tension between the pre-reform/transition and post-reform/transition individuals (Givati et al., 2018). In-depth interviews showed that pre-reform individuals felt that they were being pushed out by new academic recruits and expressed feelings of frustration and resentment if they were unable to pursue similar higher education. Conflict in practice was also highlighted; post-reform individuals who held higher-ranked

positions due to completing a bachelor's degree recalled instances of professional authority being disregarded by more experienced, though lower-ranked colleagues.

DISCUSSION

The literature review identified positive and negative outcomes of transitioning education/training to bachelor's degree-based education. Though paramedic-specific information was minimal, evidence from other health professions helps inform what outcomes may occur with different entry-to-practice pathways. Shifting towards a bachelor's degree can potentially have practice and professional benefits (Benbow & Kanji, 2019; Cafrey et al., 2019; Katyal & Kanji, 2021; Sunell et al., 2017; Williams et al., 2015); however, a bachelor's degree can be a time and financial impediment for potential students (Burke, 2018; DeRosa et al., 2021; Graf, 2006; Reid et al., 2021; Thielmann et al., 2019). It is imperative to consider the findings from all professions, with both the positive and negative outcomes presenting multiple considerations related to a transition in paramedicine.

The primary benefit of transitioning to a degree-based program is potential improvements to patient care. While the evidence found in this review for patient care is primarily from nursing, it may be inferred that similar benefits will exist for paramedicine when considered in conjunction with cognitive and clinical skills development and research engagement.

Better critical thinking and integration of relevant knowledge can improve patient safety and reduce errors (Kim & Kwak, 2024; Zhang et al., 2025) and may benefit clinical practice overall (Berg et al., 2023; Scott et al., 2021). Critical thinking relates to the ability to identify a patient's needs and find the appropriate response (Lawn et al., 2020). Students completing a four-year undergraduate degree program advance critical thinking skills through in-class experiences, such as curriculum and spending more time learning and interacting with faculty, and out-of-class experiences, with greater exposure to opportunities to develop critical thinking skills compared to shorter programs (Becker & Nguyen, 2014; Terenzini et al., 1995). With more education time, paramedics will have more knowledge and develop stronger systems of thought and cognitive skills such as critical thinking and problem-solving skills, which can result in deeper and better applied mental models and cognitive schemas that may lead to better patient care.

The development of knowledge and cognitive skills can also support patient care through engagement in EBP. Comprehension of available knowledge is crucial for implementing EBP, which is facilitated by teaching fundamental skills, including critical thinking, to understand and critique research. While evidence-based decision-making is not specific to degree holders (Kanji et al., 2011), higher education may facilitate a deeper understanding and utilization of research that advances overall EBP. Engaging with research can encourage professionals to challenge prior practices and link the academic and clinical sides of paramedicine. Relatedly, engaging in research and developing analytical skills may spur an interest and open doors to careers in education and research (Burke, 2018; Kanji et al., 2011; Kanji & Laronde, 2018).

Another potential benefit of a degree program is an increase in curriculum time to address current shortcomings in paramedic education. For example, with more curriculum time, topics such as empathy training and topics of psychological distress and mental health issues can be better addressed. Paramedicine has previously been urged to apply

empathy training to students due to a correlation between reduced empathy and burn-out in nurses and physicians (Williams et al., 2017).

A key drawback of implementing higher-level entry-to-practice in paramedicine is the inevitable increase in tuition costs and financial burden that comes with the extended duration of a degree. Diplomas provide students with a more cost-effective approach to post-secondary education. Further indirect costs may also come from transitioning to higher education. Degree programs typically exist in larger post-secondary institutions in larger urban centers. Smaller post-secondary schools, such as community colleges, that exist in smaller communities and do not offer degree programs may discontinue programs, forcing more students to move to complete their studies (DeRosa et al., 2021). Relocation also adds costs like rent, transportation, and groceries. Moreover, diplomas allow students to enter the workforce earlier while gaining professional exposure.

Although higher education is often linked to a salary increase, an advanced degree is not necessarily related to a rise in salary or SES during the entrance-to-practice period (Becker & Nguyen, 2014). Salary increases often come from leadership roles, making it less beneficial for those who do not wish to pursue a leadership position. Earlier workforce entry can enable students to earn an income, which they can invest in further education if desired. The importance of the financial aspect of transitioning into a degree program and potential barriers to students entering the profession during a time of workforce shortages is important to consider (Canada Parliament House of Commons Standing Committee on Health, 2023).

While professional standards and scope of practice are set by colleges and regulatory bodies, the level of willingness to attain the requisite level of practice by a potential learner may limit the number of people who choose to pursue paramedicine as a profession. Pursuing a bachelor's degree may seem irrelevant if a student's desired career in paramedicine, or perception of paramedicine, only requires a fundamental understanding of basic knowledge and skills. Potential paramedic students who want to master skills and feel disinterested in academics might not enter the profession if a bachelor's degree is the standard for entry to practice. Experiential learning advocates may support current models, that after developing an adequate knowledge base, students should prioritize their skills and growth through practice-based experiential learning rather than further education (Dewey, 1997).

Another major consideration is the lack of educators with a bachelor's degree in paramedicine. A limited number of North American post-secondary institutions offer a Bachelor's of Paramedicine or similar, and none offer this degree via direct entry into the program post high school or equivalent. Those that do offer this program require applicants to be practicing paramedics. The only alternative is obtaining this education in a different country. This means only a small number of paramedics in North America hold this higher education standard (Caffrey et al., 2019). With a higher standard and requirement for practice, the requirement to be an educator will rise, necessitating a bachelor's degree to teach, which could escalate educator shortages. If a transition from diploma to degree programs is implemented, post-secondary institutions should thoroughly plan for an inevitable imbalance in faculty considered "qualified" to teach.

LIMITATIONS & FUTURE DIRECTIONS

There were three primary limitations to this review. 1) Lack of literature specific to paramedicine, of the 18 sources, only 3 were focused on the paramedic profession. 2) Search terms, databases searched, academic literature, and reviews not in English were not used in this literature review. 3) No systematic evaluation method of the research quality was used for this review. However, as a literature review intended to provide a higher-level perspective on transitioning to degree-based education, rather than examining specific or explicit outcomes, the current approach was deemed appropriate.

There is a significant need for further research in paramedicine regarding the shift to higher education and paramedic education in general (Caffrey et al., 2019). The articles found for this review were largely studies or surveys based on self-reported data, thus allowing for subjectivity. Further research and evaluation should take a holistic approach, including exploring students', educators', and programs' views, opinions, and experiences while understanding educational, practice, and performance outcomes. Additionally, measuring areas such as patient outcomes or cost changes is important to fully understand the effect of a shift to a bachelor's degree. If a transition is undertaken, rigorous change management must be implemented, paired with ongoing evaluation and assessment of the process and outcomes after transition.

CONCLUSION

Based on the results of this review, clear benefits and drawbacks to implementing higher entry-level education in a profession were identified across multiple professions. Though most of the evidence exists outside of paramedicine, the consistency of positive and negative outcomes across professions, including paramedicine, and global regions indicates that it is likely the findings of this review are applicable to paramedicine in general. The decision to transition to a bachelor's level for entry to practice must consider how factors such as patient outcomes, clinical and cognitive ability, personal and relational attributes, and professional opportunity weigh against factors of accessibility, equity, and necessity for safe practice. Based on the evidence identified, it is incumbent on the profession to weigh the benefits and drawbacks of transitioning to determine what approach will provide the best overall patient, professional, and societal outcomes.

REFERENCES

- Aiken, L.H., Clarke, S.P., Cheung, R.B., Sloane, D.M., & Silber, J.H. (2003). Educational levels of hospital nurses and surgical patient mortality. *JAMA*, 290(12), 1617-1623. <https://doi.org/10.1001/jama.290.12.1617>
- Anderson, K.L., & Smith, B.S. (2009). Practicing dental hygienists' perceptions about the Bachelor of Science in Dental Hygiene and the oral health practitioner. *Journal of Dental Education*, 73(10), 1222-1232. <https://doi.org/10.1002/j.0022-0337.2009.73.10.tb04814.x>
- Becker, E.A., & Nguyen, X.T. (2014). The current impact of entry-level associate and baccalaureate degree education on the diversity of respiratory therapists. *Respiratory Care*, 59(12), 1817-1824. <https://doi.org/10.4187/respcare.03106>
- Benbow, P., & Kanji, Z. (2019). Dental hygiene baccalaureate education: A national study of students' perceived value and intentions. *Canadian Journal of Dental Hygiene*, 53(2), 89-99. <https://www.cjdh.ca/>

- Berg, C., Philipp, R., & Taff, S.D. (2023). Scoping review of critical thinking literature in healthcare education. *Occupational Therapy in Health Care*, 37(1), 18-39. <https://doi.org/10.1080/07380577.2021.1879411>
- Brooks, I.A., Grantham, H., Spencer, C., & Archer, F. (2018). A review of the literature: The transition of entry-level paramedic education in Australia from vocational to higher education (1961–2017). *Australasian Journal of Paramedicine*, 15, 1-11. <https://doi.org/10.33151/ajp.15.2.584>
- Burke, L.M. (2018). Is higher education worth the cost? It depends. *Counterpoints*, 517, 361-374.
- Caffrey, S.M., Barnes, L.C., & Olvera, D.J. (2019). Joint position statement on degree requirements for paramedics. *Prehospital Emergency Care*, 23(3), 434-437. <https://doi.org/10.1080/10903127.2018.1519006>
- Canada Parliament House of Commons Standing Committee on Health. (2023). *Addressing Canada's health workforce crisis*. <https://publications.gc.ca/site/eng/9.921706/publication.html>
- Clinton, M., Murrells, T., & Robinson, S. (2005). Assessing competency in nursing: A comparison of nurses prepared through degree and diploma programmes. *Journal of Clinical Nursing*, 14(1), 82-94. <https://doi.org/10.1111/j.1365-2702.2004.01015.x>
- Corporation for Digital Scholarship. (2025). Zotero (7.0.27) [Software]. <https://www.zotero.org/>
- DeRosa Hays, R., & Moglia Willis, S. (2021). The baccalaureate as the minimum entry-level degree in dental hygiene. *Journal of Dental Hygiene*, 95(6), 46-53. <https://pubmed.ncbi.nlm.nih.gov/34949682/>
- Dewey, J. (1997). *Experience and education*. Free Press. <http://ebookcentral.proquest.com/lib/ualberta/detail.action?docID=4934956>
- Egnatovich, J. (2022). *The perceived necessity by paramedics and paramedic employers for a college degree in the paramedic profession* (Publication No. 29398834) [Doctoral dissertation, Caldwell University]. ProQuest Dissertations & Theses. <https://dokumen.pub/the-perceived-necessity-by-paramedics-and-paramedic-employers-for-a-college-degree-in-the-paramedic-profession.html>
- Givati, A., Markham, C., & Street, K. (2018). The bargaining of professionalism in emergency care practice: NHS paramedics and higher education. *Advances in Health Sciences Education*, 23(2), 353-369. <https://doi.org/10.1007/s10459-017-9802-1>
- Graf, C.M. (2006). ADN to BSN: Lessons from human capital theory. *Nursing Economic\$,* 24(3), 135-142. <https://pubmed.ncbi.nlm.nih.gov/16786828/>
- Grant, M.J., & Booth, A. (2009). A typology of reviews: An analysis of 14 review types and associated methodologies. *Health Info Libraries Journal*, 26(2), 91-108. <https://doi.org/10.1111/j.1471-1842.2009.00848.x>
- Haron, Y., Reicher, S., & Riba, S. (2014). Factors influencing nursing career choices and choice of study program. *Health Marketing Quarterly*, 31(2), 167-177. <https://doi.org/10.1080/07359683.2014.907126>
- Jinks, A.M. (1994). Conceptualization of differing levels of educational attainment: What are the characteristics of nurses and midwives who have undertaken diploma and degree educational programmes? *Journal of Nursing Management*, 2(6), 279-285. <https://doi.org/10.1111/j.1365-2834.1994.tb00169.x>

- Kanji, Z., & Laronde, D. (2018). Motivating influences and ability-based outcomes of dental hygiene baccalaureate education in Canada. *International Journal of Dental Hygiene*, 16(3), 329-339. <https://doi.org/10.1111/idh.12330>
- Kanji, Z., Sunell, S., Boschma, G., Imai, P., & Craig, B.J. (2011). Outcomes of dental hygiene baccalaureate degree education in Canada. *Journal of Dental Education*, 75(3), 310-320. <https://doi.org/10.1002/j.0022-0337.2011.75.3.tb05044.x>
- Katyal, S., & Kanji, Z. (2021). Students' motivating influences for selecting dental hygiene and a 4-year degree: A retrospective study. *International Journal of Dental Hygiene*, 19(1), 114-120. <https://doi.org/10.1111/idh.12472>
- Kim, N.Y., & Kwak, S.J. (2024). Relationship between nurses' critical thinking disposition and patient safety incident reporting: The mediating role of patient safety culture in a comprehensive nursing service ward. *PLOS ONE*, 19(12), e0315679. <https://doi.org/10.1371/journal.pone.0315679>
- Lane, S.H., & Kohlenberg, E. (2010). The future of baccalaureate degrees for nurses. *Nursing Forum*, 45(4), 218-227. <https://doi.org/10.1111/j.1744-6198.2010.00194.x>
- Lasater, K.B., Sloane, D.M., McHugh, M.D., Porat-Dahlerbruch, J., & Aiken, L.H. (2021). Changes in proportion of bachelor's nurses associated with improvements in patient outcomes. *Research in Nursing & Health*, 44(5), 787-795. <https://doi.org/10.1002/nur.22163>
- Lawn, S., Roberts, L., Willis, E., Couzner, L., Mohammadi, L., & Goble, E. (2020). The effects of emergency medical service work on the psychological, physical, and social well-being of ambulance personnel: A systematic review of qualitative research. *BMC Psychiatry*, 20(1), 348. <https://doi.org/10.1186/s12888-020-02752-4>
- Makrides, T., Ross, L., Gosling, C., Acker, J., & O'Meara, P. (2022). From stretcher bearer to practitioner: A brief narrative review of the history of the Anglo-American paramedic system. *Australasian Emergency Care*, 25(4), 347-353. <https://doi.org/10.1016/j.auec.2022.05.001>
- Maneval, R.E., & Teeter, M.M. (2010). The student perspective on RN-Plus-10 legislation: A survey of associate degree and diploma nursing program students. *Nursing Education Perspectives*, 31(6), 358-361. <https://pubmed.ncbi.nlm.nih.gov/21280441/>
- Melnyk, B.M., Buck, J., & Gallagher-Ford, L. (2015). Transforming quality improvement into evidence-based quality improvement: A key solution to improve healthcare outcomes. *Worldviews on Evidence-Based Nursing*, 12(5), 251-252. <https://doi.org/10.1111/wvn.12112>
- Moher, D., Liberati, A., Tetzlaff, J., Altman D.G., & The PRISMA Group. (2009). Preferred reporting items for systematic reviews and meta-analyses: The PRISMA statement. *PLoS Medicine*, 6(7), e1000097. <https://doi.org/10.1371/journal.pmed.1000097>
- Murad, M.H., Asi, N., Alsawas, M., & Alahdab, F. (2016). New evidence pyramid. *BMJ Evidence-Based Medicine*, 21(4), 125-127. <https://doi.org/10.1136/ebmed-2016-110401>
- O'Meara, P.F., Furness, S., & Gleeson, R. (2017). Educating paramedics for the future: A Holistic Approach. *Journal of Health and Human Services Administration*, 40(2), 219-251. <https://doi.org/10.1177/107937391704000204>
- OpenAI. (2025). ChatGPT (July 28 version) [Large language model]. <https://chatgpt.com>
- Reid, H.L., Boyd, L.D., & Vineyard, J. (2021). Dental hygiene student attitudes about benefits of baccalaureate degree and factors impacting entry-level program choice. *Journal of Dental Education*, 85(9), 1453-1461. <https://doi.org/10.1002/jdd.12626>

- Roets, L., Botma, Y., & Grobler, C. (2016). Scholarship in nursing: Degree-prepared nurses versus diploma-prepared nurses. *Health SA Gesondheid*, 21, 422–430. <https://doi.org/10.1016/j.hsag.2016.08.002>
- Scott, I.A., Hubbard, R.E., Crock, C., Campbell, T., & Perera, M. (2021). Developing critical thinking skills for delivering optimal care. *Internal Medicine Journal*, 51(4), 488–493. <https://doi.org/10.1111/imj.15272>
- Simpson, P.M., Bendall, J.C., Patterson, J., & Middleton, P.M. (2012). Beliefs and expectations of paramedics towards evidence-based practice and research. *International Journal of Evidence-Based Healthcare*, 10(3), 197–203. <https://doi.org/10.1111/j.1744-1609.2012.00273.x>
- Snyder, H. (2019). Literature review as a research methodology: An overview and guidelines. *Journal of Business Research*, 104, 333–339. <https://doi.org/10.1016/j.jbusres.2019.07.039>
- Sunell, S., McFarlane, R., & Biggar, H. (2017). Differences between diploma and baccalaureate dental hygiene education in British Columbia: A qualitative perspective. *International Journal of Dental Hygiene*, 15(3), 236–248. <http://doi.org/10.1111/idh.12208>
- Swindells, C., & Willmott, S. (2003). Degree vs diploma education: Increased value to practice. *British Journal of Nursing*, 12(18), 1096–1104. <https://doi.org/10.12968/bjon.2003.12.18.11774>
- Terenzini, P.T., Springer, L., Pascarella, E.T., & Nora, A. (1995). Influences affecting the development of students' critical thinking skills. *Research in Higher Education*, 36(1), 23–39. <https://doi.org/10.1007/BF02207765>
- Thielmann, B., Parker, K.K., Post, J.M., & Abraham, S.P. (2019). Factors influencing nurses' perceptions of the baccalaureate degree in nursing as minimum requirement for professional practice. *Nursing Education Perspectives*, 40(1), 25. <https://doi.org/10.1097/01.NEP.0000000000000391>
- Williams, B., Fielder, C., Strong, G., Acker, J., & Thompson, S. (2015). Are paramedic students ready to be professional? An international comparison study. *International Emergency Nursing*, 23(2), 120–126. <https://doi.org/10.1016/j.ienj.2014.07.004>
- Williams, B., Lau, R., Thornton, E., & Olney, L.S. (2017). The relationship between empathy and burnout—Lessons for paramedics: A scoping review. *Psychology Research and Behavior Management*, 10, 329–337. <https://doi.org/10.2147/PRBM.S145810>
- Wills, H.L., & Asbury, E.A. (2019). The incidence of anxiety among paramedic students. *Australasian Journal of Paramedicine*, 16, 1–6. <https://doi.org/10.33151/ajp.16.649>
- Zhang, P., Xu, R., Cao, S., Mo, L., Liu, Y., Gao, C., Wu, Y., & Yu, G. (2025). Relationship between critical thinking ability and medication safety competence among clinical nurses: A multicenter cross-sectional study. *Journal of Clinical Nursing*, 34(6), 2107–2116. <https://doi.org/10.1111/jocn.17361>