Assessing Intern Confidence in Entrustable Professional Activities at Onset and Conclusion of First Year of Training: A Longitudinal Observational Study

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ABSTRACT

Background The Association of American Medical Colleges developed 13 core entrustable professional activities (EPAs) interns should proficiently perform with indirect supervision when starting residency. Despite efforts to integrate EPAs into undergraduate medical education, concerns persist regarding graduate preparedness, including interns' self-confidence in performing EPAs. Understanding interns' self-reported confidence can play a role in shaping early postgraduate supervision strategies and influence clinical decision-making as well as professional identity formation.

Objective To assess the change in interns' self-reported confidence in performing EPAs from the start to end of internship.

Methods An observational study was conducted at a university-based academic midwestern internal medicine residency program from 2019 to 2024. All interns (167 of 167) completed a confidence survey during orientation, and 83% (138 of 167) completed the same survey at the end of internship. Matched paired *t* tests evaluated changes in confidence over time. Changes for individual EPAs were examined using effect size metrics.

Results At the start of internship, EPAs with the highest percentage of self-reported confidence were history/physical examination (65%, 109 of 167), clinical encounter documentation (53%, 89 of 167), and team collaboration (72%, 121 of 167). Matched paired *t* tests showed increased confidence across all 13 EPAs over the year with a mean increase of 11.95 out of 65 possible points. Although confidence improved for all EPAs, 70% (97 of 138) of interns still lacked confidence performing general procedures and 59% (82 of 138) lacked confidence in identifying system failures.

Conclusions Intern confidence significantly improved across all core EPAs over the year, though notable gaps remained in areas such as procedures and system failures.

Introduction

The transition to internship in medical education represents a critical juncture where interns are entrusted with greater responsibilities in patient care. In response to the need for standardized expectations, the Association of American Medical Colleges (AAMC) developed 13 core entrustable professional activities (EPAs; TABLE 1), which outline essential clinical tasks that interns should be able to perform with indirect supervision upon entering residency.[1,2] Despite efforts to incorporate EPAs into undergraduate medical education (UME), residency program directors continue to express concerns about the preparedness of medical school graduates.[3-5]

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Editor's Note: The online supplementary data contains the survey used in the study and further data from the study.

Intern cohorts typically consist of individuals from various medical schools, each with differing frameworks for EPA inclusion and levels of emphasis on EPA skill development and assessment.[6] These differences may lead to a mismatch between the expectations of residency programs and the preparedness of incoming interns.[5] In addition, studies have demonstrated variability in program directors' confidence regarding interns' ability to perform core EPAs.[4,5] However, there remains limited data on how interns feel about their proficiency in these EPAs at the beginning and end of their intern year. Understanding interns' self-reported confidence can play a pivotal role in shaping early postgraduate supervision and training strategies to address clinical skill deficiencies. The primary aim of this study was to assess the change in interns' self-reported confidence in performing the EPAs from the start to end of their internship.

TABLE 1
List of Association of American Medical Colleges Entrustable Professional Activities (EPAs)

EPA 1	Gather a history and perform a physical examination
EPA 2	Prioritize a differential diagnosis following a clinical encounter
EPA 3	Recommend and interpret common diagnostic and screening tests
EPA 4	Enter and discuss orders and prescriptions
EPA 5	Document a clinical encounter in the patient record
EPA 6	Provide an oral presentation of a clinical encounter
EPA 7	Form clinical questions and retrieve evidence to advance patient care
EPA 8	Give or receive a patient handover to transition care responsibility
EPA 9	Collaborate as a member of an interprofessional team
EPA 10	Recognize a patient requiring urgent or emergent care and initiate evaluation and management
EPA 11	Obtain informed consent for tests and/or procedures
EPA 12	Perform general procedures of a physician
EPA 13	Identify system failures and contribute to a culture of safety and improvement

Methods

This longitudinal, observational study was conducted within a large university-based academic midwestern internal medicine residency program over 5 consecutive academic years (2019-2024). A survey assessing confidence (online supplementary data) in performing the 13 EPAs (TABLE 1) was developed and administered during orientation and again at the end of the first year of residency. Demographic data (online supplementary data TABLE 1) were also collected and linked to survey responses.

Confidence levels from the survey were rated on a 5-point Likert scale, which was prespecified and collapsed into a binary variable of "Confident" (4: Confident, 5: Very Confident) and "Not Confident" (1: Not at All Confident, 2: Slightly Confident, 3: Somewhat Confident). Statistical analyses, including matched paired *t* tests, were performed to evaluate changes in confidence over time. Sex differences and the impact of the COVID-19 pandemic on confidence were examined using *t* tests. Changes in individual EPAs were also examined by comparing the relative gains in confidence for each item using effect size metrics. Effect size measurement used data where both pre- and post-surveys were available.

This project was deemed nonhuman subjects research by the institutional review board of the University of Iowa.

Results

A total of 167 interns from 65 different medical schools participated in the study (online supplementary data TABLE 1). The response rate was 100% (167 of 167) at the start of the internship and 83% (138 of 167) at its conclusion. At the beginning of residency, there was no single EPA that all interns felt confident performing. Interns reported the highest confidence in EPA 1 (65%, 109 of 167), EPA 5 (53%, 89 of 167), and EPA 9 (72%, 121 of 167) and felt least confident in performing EPA 4 (13%, 22 of 167), EPA 8 (12%, 20 of 167), and EPA 12 (8%, 14 of 167; FIGURE).

Matched paired *t* tests revealed a significant increase in confidence across all 13 EPAs from the beginning to the end of the first year, with a mean increase of 11.95 out of 65 total possible points across the 13 items with an average increase of 0.99 points per item on a 5-point scale (t=20.23; df=137; $P<.001$; TABLE 2). Despite overall gains, more than 50% (70%, 97 of 138, and 59%, 82 of 138, respectively) of interns lacked confidence in performing EPAs 12 and 13 by the end of the first year (FIGURE). No significant sex differences were observed (online supplementary data TABLE 2). However, pre-COVID-19 pandemic cohorts (years 1 and 2) reported higher confidence levels compared to those who began residency during the COVID-19 pandemic (online supplementary data TABLE 3).

Discussion

The AAMC's 13 core EPAs delineate key responsibilities that medical school graduates should be capable of performing with indirect supervision at the start of postgraduate training. Most interns did not feel confident performing all 13 EPAs at the beginning of residency. Although confidence levels increased by the end of internship, notable gaps persisted, particularly for EPA 12 and EPA 13. These findings underscore the need for medical schools and residency programs to reevaluate curricula and assessment strategies to ensure that essential clinical competencies are met.

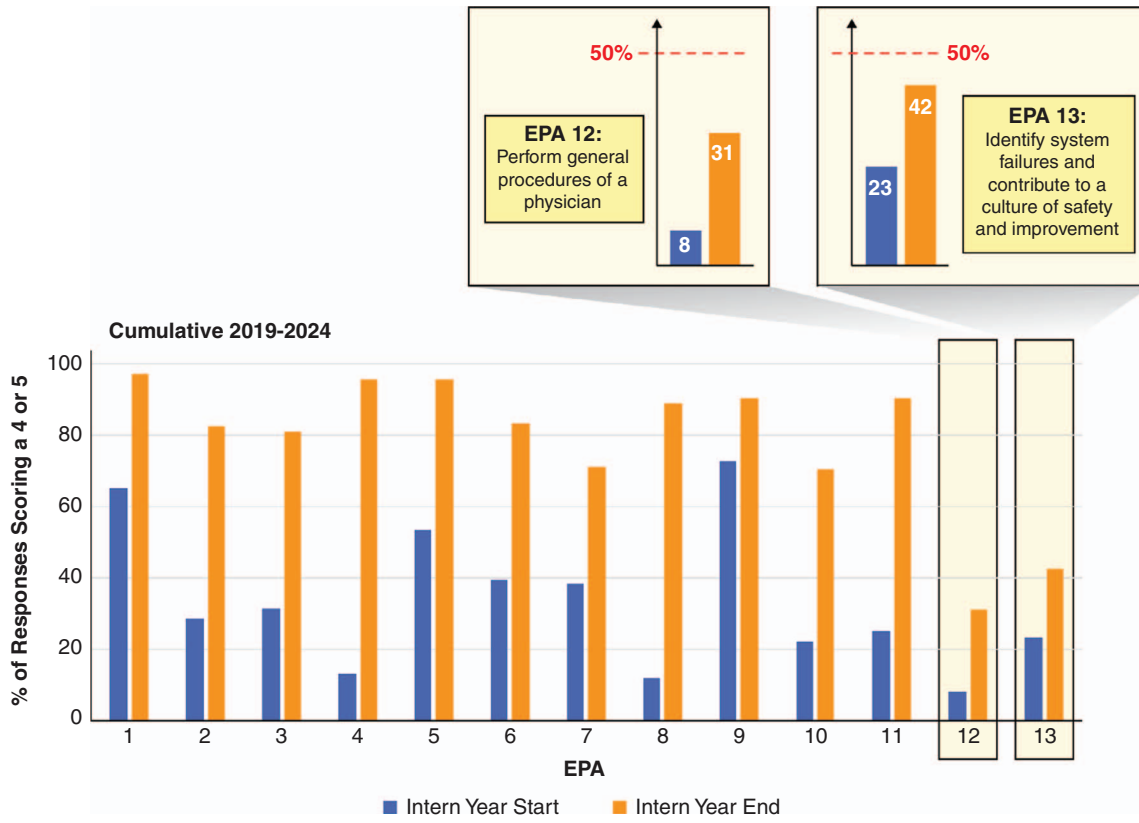

FIGURE
Percent of Residents Scoring Confident (4 or 5 on Likert Scale) at the Start and End of Intern Year per Entrustable Professional Activity

Abbreviation: EPA, entrustable professional activity.

Englander et al have called for the development of robust curricula, assessment tools, and pathways to entrustment for the EPAs.[1] Standardized assessments of EPA proficiency upon entering residency and ongoing evaluations throughout training may be necessary to ensure that interns meet these essential competencies. Based on specific skill deficits, individualized baseline assessment and direct observation and supervision could facilitate a more tailored approach to transition to residency.[7]

This study highlights that, despite improvements in self-reported confidence, confidence in performing EPAs 7, 10, 12, and 13 remained a challenge for a significant portion of interns by the end of their first year. Low confidence in performing EPAs 10 and 12 could be due to higher complexity and therefore may be harder to attain.[8,9] These EPAs may also reflect higher level learning that requires proficiency in other EPAs first.[10] Other EPAs such as EPA 13 are less likely to be addressed during medical school education, may evolve with experiential learning, and are more challenging to directly teach and assess.[9] All core EPAs assessed are incorporated in the new AAMC Foundational Competencies released in 2024, and therefore remain relevant.[11]

Notably, internal medicine program directors themselves were less likely to identify EPAs 7, 12, and 13 as necessary to possess at the beginning of residency,[3] suggesting these are viewed more appropriately as developmental goals during intern year rather than entry-level expectations. This reframes the issue as one of graduate medical education (GME) responsibility, ensuring continued growth and support during residency, rather than a UME failure to graduate fully prepared students. These findings underscore the need for GME programs to critically evaluate the timing of entrustment decisions, potentially realigning expectations to reflect realistic, stage-appropriate progressions. There has also been increased focus on developing transition-to-residency courses, which may serve as an opportunity to target EPA training and the development of confidence in specific clinical skills. However, these courses lack uniformity in the presented content.[12]

Limitations of this study include that it was conducted at a single university-based training program, limiting the generalizability of the findings, although

TABLE 2
List of Entrustable Professional Activities (EPAs) Ranked by Change in Effect Size

EPA No.	EPA Description	n	Mean	Effect Size
EPA 4	Enter and discuss orders and prescriptions	138	-1.7609	1.68
EPA 8	Give or receive a patient handover to transition care responsibility	137	-1.5474	1.65
EPA 11	Obtain informed consent for tests and/or procedures	138	-1.3043	1.19
EPA 2	Prioritize a differential diagnosis following a clinical encounter	138	-0.7899	1.13
EPA 3	Recommend and interpret common diagnostic and screening tests	138	-0.7319	1.00
EPA 10	Recognize a patient requiring urgent or emergent care and initiate evaluation and management	137	-0.9197	0.96
EPA 5	Document a clinical encounter in the patient record	138	-0.9348	0.95
EPA 6	Provide an oral presentation of a clinical encounter	138	-0.8116	0.91
EPA 1	Gather a history and perform a physical examination	138	-0.6014	0.834
EPA 12	Perform general procedures of a physician	138	-0.8768	0.829
EPA 7	Form clinical questions and retrieve evidence to advance patient care	138	-0.6449	0.74
EPA 13	Identify system failures and contribute to culture of safety and improvement	138	-0.6014	0.59
EPA 9	Collaborate as a member of an interprofessional team	137	-0.3504	0.40

Note: All questions were statistically significant with different effect sizes. TABLE 2 is ranked in order of effect size, largest to smallest. Effect size calculated by dividing mean by standard deviation (not included).

the cohort represented 65 different medical schools. Additionally, the study relied on self-reported confidence levels, which may not directly correlate with actual proficiency. However, self-reported confidence remains a meaningful measure of interns' perceived readiness to perform EPAs, as confidence influences clinical decision-making, patient care engagement, and supervision needs—factors with practical implications for residency training. Confidence also plays a critical role in professional identity formation and ongoing skill development.[13-15] Another key limitation is that the survey focused on confidence but did not incorporate the concept of supervision or entrustability, which are central to the core EPA framework. The well-documented misalignment between self-assessment and observed performance[16,17] underscores the need for further studies to correlate self-reported confidence using objective measures such as objective structured clinical examinations and workplace-based assessments to better determine levels of supervision. Future research could explore this alignment to better inform intern readiness and curriculum development.

Conclusions

Intern confidence significantly improved across all core EPAs over the course of the year, though notable gaps remained in areas such as performing procedures and identifying system failures.

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