

## CHAPTER 12

# Considerations in building a curriculum using entrustable professional activities

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### Abstract

Competency-based education of health professionals has been gaining momentum across the globe for the past two decades. The central tenet is to start with the outcomes that are required of a trainee to meet the health care needs of the public. These outcomes lead to the elaboration of requisite competencies, which in turn drive the curriculum and assessment programs. Educators have encountered many challenges in the development and implementation of curricula and assessment systems that effectively teach and measure performance of the requisite competencies. Entrustable professional activities (EPAs) offer an excellent framework for addressing many of those challenges.

In this chapter, we offer the unique potential of an EPA framework in promoting a competency-based curriculum. We review some of the curricular structural implications of using EPAs, including the role of sequencing of EPAs in the curriculum, describe how an EPA-based curriculum adds agency to the trainee's journey, and explore the notion of time-variability in competency-based education and training based on success stories using an EPA framework. We conclude that a well-designed curriculum and assessment system using EPAs provides an excellent foundation for ensuring health professionals' readiness to provide safe and effective care within the scope of their discipline and at the appropriate level of supervision.

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## Introduction

Understanding how a curriculum can be built using entrustable professional activities (EPAs) requires a general understanding of how competency-based curricula are derived and how they differ in significant ways from the traditional structure, content, and process model of medical education prevalent across the globe throughout the past century or more. The central tenet of a competency-based system of education is to start with the needs of the public served by the trainees. The defined public needs then drive the delineation of competencies required of practitioners in the field. Those competencies in turn drive the curriculum and assessment required to ensure graduates of the education or training program are prepared for their respective transitions.<sup>1-3</sup> Thus, all aspects of curriculum and assessment can be directly linked to one or more of the requisite competencies. This is in direct contrast to the traditional model of health professions education, in which the central driver is the curriculum. In this traditional model, assessments are derived from the curriculum and the trainee outcomes are determined by time-based exposure to the curriculum. Curriculum is defined in this chapter as the totality of the trainee's experiences within the training program.<sup>4</sup>

Features of a competency-based system also include de-emphasizing the hierarchical teacher-trainee structure and focusing on a teacher-trainee collaboration, empowering the trainee to determine where time is best spent to work on development of competence; and moving from calendar-based lesson plans where 'one-size-fits-all' to variable-time progression based on the development and demonstration of competence.<sup>1</sup> Assessment also differs in a competency-based system and is covered elsewhere in this book, in particular Chapters 17 and 18. Any curriculum that incorporates an EPA framework will need to adhere to these tenets of competency-based education. In a seminal article, Van Melle and colleagues lay out the five core components of a competency-based medical education program: *defining the outcome competencies*, which are then *sequenced progressively* through *tailored learning experiences* using *competency-focused instruction*. *Programmatic assessment* of the trainee then supports and documents the developmental acquisition of competence.<sup>5</sup>

In this chapter, we consider the unique potential of an EPA framework in promoting a competency-based curriculum. We review some of the structural implications of using EPAs, including the role of sequencing of EPAs in the curriculum, describe how an EPA-based curriculum adds agency to the trainee's journey, and explore the notion of time-variability in competency-based education and training based on success stories using an EPA framework.

### EPAs offer a unique curricular framework

EPAs offer a unique framework for operationalizing competency-based education in the health professions by placing competencies in the context of practice in the clinical workplace.<sup>6</sup> EPAs are descriptions of patient care activities that a competent person may be entrusted to perform. In contrast, competencies are descriptions of the characteristics of a person who would be competent to perform patient care activities.<sup>7</sup> Competencies support the ability of a person to perform EPAs and can be mapped to EPAs. That is, each EPA requires a subset of the overall competencies required of the educational or training program to perform the EPA safely and effectively (see Chapter 7 for additional details regarding the differences between competencies and EPAs). As an example, an EPA for a pediatrician might be to 'care for a well newborn.' This is clearly an essential task of a pediatrician that can be observed and entrusted to a competent practitioner to perform at the unsupervised level. Performing the EPA, though, requires the integration of several competencies, such as: the ability to communicate with families, the knowledge of requisite newborn screening and nutritional recommendations, the ability to perform a newborn physical exam,

and the ability to take a maternal history to understand potential risks to the newborn. EPAs thus provide a meaningful, highly practical, and feasible core for the teaching and assessment of most of the requisite competencies of a health professional trainee. This is not to say that EPAs represent the totality of a curriculum, as EPAs may not fully capture the entirety of the desired competencies. Some requisite competencies may not fall within the framework of the EPAs. For example, a training program that includes a research component would have graduate competencies in research skills that would not be covered by EPAs focused on patient care activities.

Where EPAs may not best or solely be used to teach and assess all the competencies, mitigation strategies have been suggested and employed. For example, owing to its emphasis on professional activities or tasks, some educators have voiced concerns that teachers and trainees may lose sight of the specific competencies underlying individual EPAs when teaching or assessing the EPAs.<sup>8</sup> For instance, important competencies related to professionalism behaviors or habits while mapped to individual EPAs may not be explicit and can be at risk of being overlooked in both the curriculum and trainee assessment. In addition, relying on observations of EPAs to assess knowledge outcomes may result in undersampling of content and inadequate evidence of knowledge.

One strategy for addressing this concern is a model adopted by the Royal Australasia College of Physicians and the Irish Internship Curriculum, which combines the use of EPAs and competencies by conceptualizing competency outcomes into three categories: Do, Know, and Be.<sup>9</sup> EPAs articulate the Do competencies—units of essential professional activities graduates are expected to be able to perform at the completion of a training program. The Know category represents the knowledge graduates must have to safely carry out the EPAs. The Be category describes the behaviors, values, and habits expected in health professionals. In this model, the Know and Be competencies support the Do competencies by enabling trainees to perform the EPAs. All three sets of competencies—Do, Know, and Be—drive the curriculum and the assessment program using different assessment tools to measure competence in each of the three categories.

An emerging conception of competence considers different types of competence in three layers: canonical, contextual, and personalized competence.<sup>10</sup> Canonical competence is the core knowledge and skills needed for a health professional. Contextual competence is the application of the core knowledge and skills in a variety of workplace- and patient-specific contexts. Personalized competence is the practitioner's personal style of practice, which becomes increasingly relevant for senior trainees and practitioners. Though not synonymous, there is overlap with the Do, Know, Be model. Canonical competence can be seen as falling primarily under the Know category and contextual competence as falling primarily under the Do category. Different aspects of the Be category could be captured in canonical, contextual, and personalized competence. Over time and with evolution in practice, the Be category becomes increasingly aligned with personalized competence. In this conception of competence, EPAs provide a focus on the contextual level of competence which can be augmented by attention to the canonical and personalized layers.

It is worth noting that the implementation of an EPA framework may be subject to national or local considerations or both, such as what EPAs might be required at the local or national level and when, in the curriculum, they can be entrusted to trainees to perform under which levels of supervision. In several countries, national bodies have defined core EPAs for an entire profession or discipline. Institutions or programs may or may not be able to adapt or add to these core EPAs based on local priorities and regulations. In such cases, in addition to the implementation of core EPAs, programs might opt to include selective or elective EPAs to signal unique program offerings or strengths. Different jurisdictions, national or local, may also have differing accreditation and patient safety regulations that impact a trainee's role in patient care and what professional activities trainees may be entrusted with and at what levels of supervision. Chapter 14 provides further exploration of the implications of nationally versus locally defined EPA-based curricula.

### Longitudinal and developmental curricula may optimize use of the EPA framework

The central goal of an EPA-based curriculum is to have trainees achieve a predetermined level of entrustment for each EPA as a prerequisite for transition to less supervised practice. That level of entrustment is most commonly *indirect supervision* for trainees moving from pre-licensure or undergraduate professional education to post-licensure or postgraduate education and *unsupervised practice* for trainees moving from either pre- or post-licensure education directly into practice. The ideal curriculum, then, would build the required knowledge and skills (the ‘Know’ and ‘Do’) in a developmental and longitudinal way. From a pedagogical standpoint, this developmental progression often starts with classroom education through case-based learning and then moves into clinical education without contributions to patient care, such as simulation with standardized patients, followed by clinical education with contributions to patient care utilizing learning experiences in the authentic clinical learning environment.

Health professions education typically follows this type of curricular path, with early classroom education followed by clinical education and increasing contributions to patient care in authentic clinical environments. The ‘basic science’ or predominantly classroom phase of health professions education offers opportunities to introduce the EPAs and build the foundational knowledge and skills in a longitudinal fashion (see Chapter 13 for how foundational knowledge and skills can be mapped to EPAs). Clinical skills courses that are built longitudinally to parallel the basic science courses can be ideal for an EPA curriculum. An example from medical education might be the undergraduate EPA ‘perform a physical examination.’ This EPA exists in some form in almost all UME iterations of EPAs to date (e.g., the core EPAs for pharmacy graduates or the core EPAs for entering residency in the US).<sup>11,12</sup> Take as an example the physical exam of the heart and lungs. The curriculum can provide experiences to engage trainees in courses involving knowledge and case-based learning around the heart and lungs while simultaneously teaching and assessing the heart and lung exam in a clinical skills course, using standardized patients or simulation. This would prepare trainees well for the actual performance of the physical exam in the clinical learning environment, where they would be expected to reach the level of indirect supervision before advancement to residency, or to unsupervised physical examinations in localities where medical students graduate into practice.

The traditional model of clinical education can pose some challenges to an EPA-based curriculum. First, because EPAs are rooted in the concepts of trust and entrustment, longitudinal supervisor–trainee relationships over time are a critical component to assessment at large, and specifically for the development of trust that informs assessment and feedback on EPAs<sup>13</sup> (see Chapters 4 and 18 for an in-depth exploration of the concepts of trust and entrustment). Generally, the use of multiple assessors and multiple observations can provide aggregate reliable and valid data to inform entrustment decisions.<sup>14</sup> At the same time, the trust built longitudinally between a supervisor or supervisors and trainees makes for more meaningful feedback and entrustment decisions.<sup>15</sup> Thus, an ideal curriculum will balance the need for multiple assessments and assessors with the provision of longitudinal relationships that allow for the development of deep trust over time.

A second challenge to an EPA-based curriculum in traditional clinical training is the tension between the fractured nature of ‘rotation-based’ training, and the developmental, longitudinal approach to competence development. The fragmentation of the clinical curriculum and its inconsistency with the tenets of competency-based education in general has been the subject of concern for a while.<sup>16,17</sup> This challenge is further underscored when employing an EPA-based curriculum that is founded on longitudinal development of competence and trust between supervisors and trainees. While the fragmented rotational approach is challenging, we recognize that many curricula will continue to employ this structure. Understanding this reality, Chapters 13 and 14

discuss mapping of EPAs to a rotational curricular structure to promote development. One potential curricular change to address the fragmentation and underscore the developmental approach to an EPA-based curriculum is increasing the longitudinality and the integration of curricula. This strategy has several benefits: (a) it enhances the opportunities for supervisor–trainee relationship development over time; (b) it allows multiple observations of the EPA over time, increasing the potential richness of feedback; and (c) it is consistent with learning theory, such as interleaving (the mixing of multiple subjects simultaneously during a defined study period).<sup>18</sup>

One specific tactic related to improving longitudinality of the curriculum that has been employed in UME is the longitudinal integrated clerkship (LIC). This tactic has been used predominantly in Australia, Canada, South Africa, and the United States. The basic concept is that trainees in their core clerkship curriculum are assigned to a primary care clinic, which they attend several times a week, and then spend half-days throughout the better part of a year with the preceptors in the core specialties represented by the clerkships (such as surgery, psychiatry, pediatrics, emergency medicine, and obstetrics and gynecology). The trainees thus have the opportunity to develop year-long relationships with patients, peers, and preceptors. For a definitive reference on LICs, the reader is referred to *Longitudinal Integrated Clerkships: Principles, Outcomes, Practical Tools and Future Directions*.<sup>19</sup>

LICs create the ideal learning pathway for an EPA-based curriculum by both nurturing the trust between supervisors and trainees and allowing the development of competence, leading to entrustment over time. In fact, LICs and EPAs have been called a ‘perfect match.’<sup>20</sup> Similar curricular tactics to address the need to increase longitudinality and employ an EPA-based curriculum in the residency space have been published, but generally on an individual program-by-program basis.<sup>21,22</sup>

### **EPAs can provide the scaffolding for a sequenced progression through a curriculum**

Curriculum designers developing an EPA framework sequence the curriculum by considering how trainees develop task-specific expertise requiring decreasing supervision over time.<sup>5</sup>

#### *Sequencing from simple to more complex tasks*

One such sequence might go from simpler tasks to more complex tasks that include those simpler tasks. In some of these instances, the simpler EPAs have been referred to as ‘nested’ within the more complex EPAs.<sup>23</sup> An example of such a sequence might be being taught and assessed in interviewing and examining patients, followed by engaging in the provision of care as part of a team (e.g., reporting and interpreting tests), followed by having primary responsibility for elements of a patient’s care (such as entering orders and writing prescriptions), and, eventually, to practicing independently and supervising others. Nested EPAs are further defined in Chapter 10 and are explored in the context of curriculum implementation in Chapters 13 and 14.

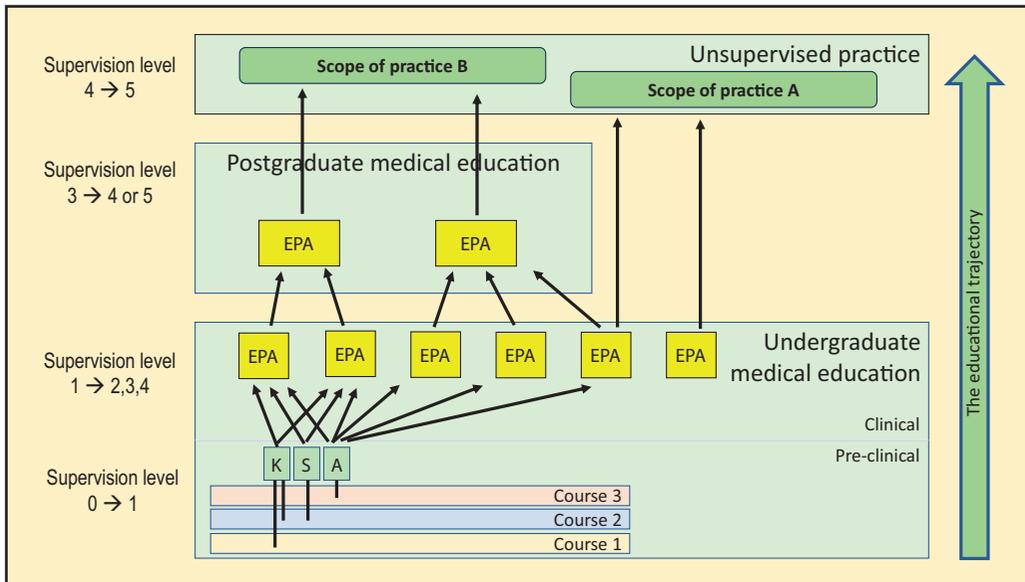
Thinking about this sequenced progression as the primary goal of the curriculum helps designers specify teaching and learning opportunities that provide for the development and demonstration of relevant skills and assessments that can yield helpful formative feedback and inform progression decisions.<sup>24</sup> Such sequencing might also better enable a program to recognize a trainee who is struggling and provide support and remediation earlier. In the few extreme circumstances in which a trainee is unable to achieve entrustment, earlier detection through proper sequencing may also provide a more ethical basis for offering a compassionate opportunity to leave the training program before the trainee has invested substantial time and money.<sup>25</sup>

*Sequencing across the education–training–practice continuum*

Another option for sequencing is across the education–training–practice continuum. EPAs can be useful at any part of professional training. In their applications in medical school training, for example, EPAs have been used to help trainees progress to caring for the general medical patient without direct supervision.<sup>12,26</sup> EPAs for postgraduate medical education (PGME) can support progression to independent practice by field of specialty and then subspecialty.<sup>7,27</sup> The literature is replete with examples of EPAs developed for the transition from the preclerkship to the clerkship phase of medical school, piloted as a framework for the transition from medical school to residency, and integrated into the design of a comprehensive medical school curriculum.<sup>23,28,29</sup> Within specialty training in medicine, EPAs have been developed as frameworks for training in many fields including internal medicine, family medicine, anesthesia, pediatrics, general surgery, and surgical subspecialties. Many of the UME EPAs can be seen as nested in the broader EPAs of those specialties. Figure 12.1 uses medical education and training to depict the way learning experiences in each phase of education can sequence EPAs to substantiate assessment and entrustment, leading progressively to more advanced EPAs requiring less and less supervision as a trainee advances from undergraduate medical education to postgraduate medical education and then to unsupervised practice.

In each phase of education and training (undergraduate, postgraduate, and unsupervised practice), EPAs can be used to guide teaching, learning, and assessment toward entrustment and associated advancement in supervisory levels. EPAs from one phase can be nested into more advanced EPAs in subsequent phases and, eventually, inform a specific scope of professional practice (Figure 12.1).

Considerations for sequencing across the education–training–practice continuum also have implications for continuing professional development and the maintenance (or expiry) of competence. As health professions using EPAs as the framework for curriculum and assessment continue to implement their programs, they have encountered several EPAs for which trainees at



**Figure 12.1:** EPAs as a scaffold for sequenced progression.

the transition to practice are not uniformly gaining entrustment at the time of that transition. To overcome this challenge, two potential solutions can be considered: (a) curricula during training can adapt to ensure that trainees have the requisite learning and assessment opportunities before graduation to reach entrustment at the unsupervised level, or (b) health professions will need to provide continuing learning and assessment opportunities (continuing professional development) in practice to allow the practicing physician to be entrusted and maintain entrustment at the unsupervised level.

### **Trainee agency in an EPA-based curriculum**

Another potential benefit to an EPA-based curriculum is the agency it affords trainees in individualizing their training experience to meet personal learning needs. The foundation of an EPA-based curriculum is direct observation of a trainee performing the EPA. Trainees have access to their EPA assessment data and thus the best knowledge of their strengths and opportunities for improvement. Further, they can actively engage the supervisor in addressing gaps by requesting the EPA to be observed during any specific clinical supervision experience. In this way the EPA-based curriculum provides boundaries for a trainee to be intentional in the selection of their learning opportunities and lean into asking for and managing feedback to build confidence in their work<sup>30</sup> (further discussion of the individualized learning plan opportunities afforded by an EPA-based curriculum are discussed in Chapter 14). The trainee's demonstration of agency through proactively seeking feedback builds trust with the supervisor around the trainee's self-reflection and knowledge of their limitations, while also affording the supervisor the opportunity to observe the trainee's growth.<sup>15</sup>

In addition to having agency around the EPAs chosen for assessment, trainee agency can take other forms in an EPA-based curriculum. For example, trainee agency can include being forthcoming with direct verbal and written communication, being engaged in their own development with curiosity and passion, and even anticipating problems and taking ownership of a patient's care.<sup>15</sup> An EPA-based curriculum provides a workplace-based, activities-focused mechanism for building these proactive behaviors of trainee agency, connecting the autonomous work to meaningful growth and learning.

Agency is developed over time through an iterative process where the growth of trust between the supervisor and trainee allows for increasing confidence of the trainee in their capacity to perform the EPAs, while simultaneously increasing awareness of their limitations and increasing ability to navigate discussion with supervisors about their performance.

The trainee's agency growth in an EPA- and practice-based curriculum supports a shift from identity primarily as a trainee to identity as a professional (professional identity formation). In the early stages of professional identity formation, the trainee is self-centered and externally defined, concerned with their knowledge and skills, as with an early trainee, where high-level performance on a test is the focus. However, through focusing on essential tasks of the professional in an EPA-based curriculum, trainees are able to develop their own professional identity by completing the work, where their understanding goes beyond themselves to recognize their role in the health care team (see also Chapter 13).<sup>31</sup> Core elements of an EPA-based curriculum that support professional identity formation include: developing confidence in practice, managing feedback on their work, dealing with supervision in the context of practice, and creating learning opportunities.<sup>30</sup> Trainee agency and professional identity formation produce a positive feedback loop, in which trainee agency increases as they begin to better understand the work via the EPA curriculum, and, as their agency develops and increases engagement in the work, trainees can better understand their professional role within the team.

## An EPA-based curriculum as an ideal structure for time-variable advancement

An EPA-based curriculum also affords attention to one of the central tenets of competency-based education—the outcomes or competencies are fixed, while the time to achieve competence is variable. The notion of time-variability in health professions education and training has been challenged by traditional time-based models across most of the Western world. The call to move to time-variable education and training in the health professions has been gaining traction in the last decade.<sup>32,33</sup> Despite these calls, significant challenges remain, including: (a) calendar-based academic programs with fixed-time phases, courses, clerkships, and rotations; (b) health profession schools' accreditation requirements that mandate a minimum time in training; (c) individual practitioner certification bodies that mirror the program requirements for time in training; (d) yearly single opportunities to transition from one phase of education and training to another (such as from medical school to residency in the USA and Canada); (e) logistical challenges from off-cycle onboarding and graduations; (f) lack of clear criteria for advancement; and (g) lack of an adequate curriculum and assessment system to teach and assess the competencies in a manner that allows all stakeholders to have confidence in variable-time advancement decisions. An EPA-based curriculum offers the potential to address clear criteria and establish a curriculum and assessment system that yields defensible advancement decisions. Two programs have been published in the literature that have successfully implemented competency-based, time-variable advancement. The programs are highlighted in Boxes 12.1 and 12.2, respectively.

The difficulty of facing all the challenges to time-variable advancement was underscored in a recent publication that sought to engage any of 46 residency programs in one US health system in a competency-based, time-variable pilot.<sup>33</sup> Only 10 of the 46 programs originally expressed interest in the pilot, and of those only one was able to actually implement this time-variable model in their residency program. The success of the Toronto Orthopedics Program and of the Education in Pediatrics Across the Continuum (EPAC) described in Boxes 12.1 and 12.2 suggests that using EPAs as the foundation for the curriculum and assessment system offers perhaps the best hope to date for the realization of a true competency-based, time-variable system of education and training. However, it is worth noting that, even in a fixed-time program, there can be opportunities for individual trainees to advance and

### Box 12.1: The Toronto Orthopedic Residency Program.<sup>22</sup>

One program that successfully navigated the paradigm shift to competency-based, time-variable education using an EPA framework is the University of Toronto Orthopedics Program in Toronto, Canada. In 2009, the program moved to a competency-based format that allowed the potential for time-variable advancement through the demonstration of competence within modules. Each module had a set of (a minimum of two) associated EPAs specific to the context and module. Trainees had to demonstrate competence in those EPAs to move to the subsequent module. The program leaders published the results of their first eight years of experience.<sup>22</sup> During that time, they went from just a proportion of residents piloting this curriculum to full-scale implementation across all residents due to its success. More than half of their residents graduated after four years, compared to the required five years in the traditional program. As of the publication, no resident had taken longer than five years to demonstrate competence. Finally, all resident graduates of the program passed their certification examination on the first attempt and had successful fellowships in orthopedic subspecialties independent of time to graduation from residency.

### Box 12.2: The Education in Pediatrics Across the Continuum Pilot.<sup>34</sup>

A second program demonstrating successful competency-based, time-variable advancement using an EPA curriculum is a program in pediatrics in the USA that spans UME through GME. The program is called 'Education in Pediatrics Across the Continuum' (EPAC) and was specifically designed to test the feasibility of competency-based, time-variable advancement from UME to GME and GME to practice or fellowship.<sup>34</sup> It engaged up to four students per year at each of four medical schools from across the USA. The pilot followed four cohorts from entry in the preclerkship curriculum of the medical school through completion of pediatric residency. Upon entry into the program, students agreed to stay for residency at the program of origin in pediatrics. Advancement from UME to GME, in addition to the medical schools' graduation requirements, was determined by the student's demonstration of competence at the indirect supervision level for all the 13 core EPAs for entering residency.<sup>35</sup> Similarly, advancement from residency to fellowship or practice was dependent on the demonstration of competence at the unsupervised level for the 17 core EPAs for general pediatrics.<sup>36</sup> While all programs were able to provide the scaffolding for time-variable, competency-based advancement, only three of the four were able to advance students in a time-variable fashion. The fourth program was able to document readiness for advancement but unable to advance students owing to state education board considerations.

achieve entrustment at variable rates for different EPAs. Also, trainees advancing at a faster pace can pursue additional elective EPAs to maximize their learning within the fixed-time program. Ideas for trainee-centered variability within time-fixed programs are further explored in Chapter 14.

## Conclusion

The paradigm shift to competency-based education is occurring across multiple continents and across health professions.<sup>1-3</sup> Competencies designed to meet the needs of the public have been delineated in many health professions, often at a national level by level of education or training (such as pre-licensure/undergraduate or post-licensure/postgraduate education), within a specialty (such as obstetrics and gynecology or pediatrics), or for an entire profession (such as physical therapy or pharmacy). Educators have encountered many challenges in the development and implementation of curricula and assessment systems to teach and measure performance of the requisite competencies. EPAs offer an excellent framework for addressing many of those challenges. A well-designed curriculum and assessment system using EPAs provides an excellent foundation for ensuring health professionals readiness to provide safe and effective care within the scope of their discipline and at the appropriate level of supervision.

## Competing interests

The authors declare that they have no competing interests.

## Figure justification

Figure 12.1 was adapted with permission from a presentation created for the online international Ins and Outs of Entrustable Professional Activities course ([www.epa-courses.nl](http://www.epa-courses.nl)).

## References

1. Carraccio C, Wolfsthal SD, Englander R, Ferentz K, Martin C. Shifting paradigms: from Flexner to competencies. *Acad Med.* 2002;77(5):361–367. DOI: <https://doi.org/10.1097/00001888-200205000-00003>
2. Frenk J, Chen L, Bhutta ZA, et al. Health professionals for a new century: transforming education to strengthen health systems in an interdependent world. *Lancet.* 2010;376(9756):1923–1958. DOI: [https://doi.org/10.1016/S0140-6736\(10\)61854-5](https://doi.org/10.1016/S0140-6736(10)61854-5)
3. Frank JR, Snell LS, Cate OT, et al. Competency-based medical education: theory to practice. *Med Teach.* 2010;32(8):638–645. DOI: <https://doi.org/10.3109/0142159X.2010.501190>
4. Kelly AV. *The Curriculum: Theory and Practice.* 6th ed. SAGE Publications Ltd; 2009.
5. Van Melle E, Frank JR, Holmboe ES, et al. A core components framework for evaluating implementation of competency-based medical education programs. *Acad Med.* 2019;94(7):1002–1009. DOI: <https://doi.org/10.1097/ACM.0000000000002743>
6. ten Cate O, Scheele F. Competency-based postgraduate training: can we bridge the gap between theory and clinical practice? *Acad Med.* 2007;82(6):542–547. DOI: <https://doi.org/10.1097/ACM.0b013e31805559c7>
7. ten Cate O. Entrustability of professional activities and competency-based training. *Med Educ.* 2005;39(12):1176–1177. DOI: <https://doi.org/10.1111/j.1365-2929.2005.02341.x>
8. Krupat E. Critical thoughts about the core entrustable professional activities in undergraduate medical education. *Acad Med.* 2018;93(3):371–376. DOI: <https://doi.org/10.1097/ACM.0000000000001865>
9. Boland J, Offiah G. *Curriculum Framework for the Internship Programme in Ireland.* Health Service Executive; 2023.
10. ten Cate O, Khursigara-Slattery N, Cruess RL, Hamstra SJ, Steinert Y, Sternszus R. Medical competence as a multilayered construct. *Med Educ.* 2024;58(1):93–104. DOI: <https://doi.org/10.1111/medu.15162>
11. Haines ST, Pittenger AL, Stolte SK, et al. Core entrustable professional activities for new pharmacy graduates. *Am J Pharm Educ.* 2017;81(1):S2. DOI: <https://doi.org/10.5688/ajpe811S2>
12. Englander R, Flynn T, Call S, et al. Toward defining the foundation of the MD degree: core entrustable professional activities for entering residency. *Acad Med.* 2016;91(10):1352–1358. DOI: <https://doi.org/10.1097/ACM.0000000000001204>
13. Hauer KE, ten Cate O, Boscardin C, Irby DM, Iobst W, O'Sullivan PS. Understanding trust as an essential element of trainee supervision and learning in the workplace. *Adv Health Sci Educ Theory Pract.* 2014;19(3):435–456. DOI: <https://doi.org/10.1007/s10459-013-9474-4>
14. Violato C, Cullen MJ, Englander R, et al. Validity evidence for assessing entrustable professional activities during undergraduate medical education. *Acad Med.* 2021;96(7S):S70–S75. DOI: <https://doi.org/10.1097/ACM.0000000000004090>
15. ten Cate O, Chen HC. The ingredients of a rich entrustment decision. *Med Teach.* 2020;42(12):1413–1420. DOI: <https://doi.org/10.1080/0142159X.2020.1817348>
16. Holmboe E, Ginsburg S, Bernabeo E. The rotational approach to medical education: time to confront our assumptions? *Med Educ.* 2011;45(1):69–80. DOI: <https://doi.org/10.1111/j.1365-2923.2010.03847.x>
17. Englander R, Carraccio C. A lack of continuity in education, training, and practice violates the 'do no harm' principle. *Acad Med.* 2018;93(3S):S12–S16. DOI: <https://doi.org/10.1097/ACM.0000000000002071>
18. Rohrer D, Pashler H. Recent research on human learning challenges conventional instructional strategies. *Educational Researcher.* 2010;39(5):406–412. DOI: <https://doi.org/10.3102/0013189X10374770>

19. Poncelet A, Hirsh D, eds. *Longitudinal Integrated Clerkships: Principles, Outcomes, Practical Tools and Future Directions*. Gegensatz Press; 2016.
20. Englander R, ten Cate O. LICs and entrustable professional activities: a perfect match. In: Poncelet A, Hirsh D, eds. *Longitudinal Integrated Clerkships (LICs) - Principles, Outcomes, Practical Tools and Future Directions*. 1st ed. Alliance for Clinical Education/Gegensatz Press; 2016:261–270.
21. Warm EJ, Mathis BR, Held JD, et al. Entrustment and mapping of observable practice activities for resident assessment. *J Gen Intern Med*. 2014;29(8):1177–1182. DOI: <https://doi.org/10.1007/s11606-014-2801-5>
22. Nousiainen MT, Mironova P, Hynes M, et al. Eight-year outcomes of a competency-based residency training program in orthopedic surgery. *Med Teach*. 2018;40(10):1042–1054. DOI: <https://doi.org/10.1080/0142159X.2017.1421751>
23. ten Cate O, Graafmans L, Posthumus I, Welink L, van Dijk M. The EPA-based Utrecht undergraduate clinical curriculum: development and implementation. *Med Teach*. 2018;40(5):506–513. DOI: <https://doi.org/10.1080/0142159X.2018.1435856>
24. Peters H, Holzhausen Y, Boscardin C, ten Cate O, Chen HC. Twelve tips for the implementation of EPAs for assessment and entrustment decisions. *Med Teach*. 2017;39(8):802–807. DOI: <https://doi.org/10.1080/0142159X.2017.1331031>
25. Bellini LM, Kalet A, Englander R. Providing compassionate off-ramps for medical students is a moral imperative. *Acad Med*. 2019;94(5):656–658. DOI: <https://doi.org/10.1097/ACM.0000000000002568>
26. Pinilla S, Lenouvel E, Cantisani A, et al. Working with entrustable professional activities in clinical education in undergraduate medical education: a scoping review. *BMC Med Educ*. 2021;21(1):172. DOI: <https://doi.org/10.1186/s12909-021-02608-9>
27. Liu L, Jiang Z, Qi X, et al. An update on current EPAs in graduate medical education: a scoping review. *Med Educ Online*. 2021;26(1):1981198. DOI: <https://doi.org/10.1080/10872981.2021.1981198>
28. Chen HC, McNamara M, Teherani A, ten Cate O, O'Sullivan P. Developing entrustable professional activities for entry into clerkship. *Acad Med*. 2016;91(2):247–255. DOI: <https://doi.org/10.1097/ACM.0000000000000988>
29. Amiel J, Ryan MS, Andriole DA, Whelan AJ. *Core Entrustable Professional Activities for Entering Residency Summary of the 10-School Pilot 2014–2021*. Association of American Medical Colleges; 2022.
30. Bremer AE, van de Pol MHJ, Laan RFJM, Fluit CRMG. How an EPA-based curriculum supports professional identity formation. *BMC Med Educ*. 2022;22(1):48. DOI: <https://doi.org/10.1186/s12909-022-03116-0>
31. Cruess RL, Cruess SR, Boudreau JD, Snell L, Steinert Y. A schematic representation of the professional identity formation and socialization of medical students and residents: a guide for medical educators. *Acad Med*. 2015;90(6):718–725. DOI: <https://doi.org/10.1097/ACM.0000000000000700>
32. Lucey CR, Larson T, eds. *Achieving Competency-Based, Time-Variable Health Professions Education*. Josiah Macy Jr Foundation; 2018.
33. Goldhamer MEJ, Pusic MV, Nadel ES, Co JPT, Weinstein DF. Promotion in place: A model for competency-based, time-variable graduate medical education. *Acad Med*. 2024;99(5):518–523. DOI: <https://doi.org/10.1097/ACM.0000000000005652>
34. Andrews JS, Bale JF, Soep JB, et al. Education in Pediatrics Across the Continuum (EPAC): first steps toward realizing the dream of competency-based education. *Acad Med*. 2018;93(3):414–420. DOI: <https://doi.org/10.1097/ACM.0000000000002020>
35. Englander R, Flynn T, Call S, et al. *Core Entrustable Professional Activities for Entering Residency - Curriculum Developers Guide*. AAMC; 2014:1–114.
36. Entrustable professional activities for general pediatrics. May 2023. Accessed April 8, 2024. <https://www.abp.org/content/entrustable-professional-activities-general-pediatrics>