The promise, perils, problems and progress of competency-based medical education

Claire Touchie[1,2] & Olle ten Cate[3]

CONTEXT Competency-based medical education (CBME) is being adopted wholeheartedly by organisations worldwide in the hope of meeting today's expectations for training a competent doctor. But are we, as medical educators, fulfilling this promise?

METHODS The authors explore, through a personal viewpoint, the problems identified with CBME and the progress made through the development of milestones and entrustable professional activities (EPAs).

RESULTS Proponents of CBME have strong reasons to keep developing and supporting this broad movement in medical education. Critics, however, have legitimate reservations. The authors observe that the recent increase in use of milestones and EPAs can strengthen the purpose of CBME and counter some of the concerns voiced, if properly implemented.

CONCLUSIONS The authors conclude with suggestions for the future and how using EPAs could lead us one step closer to the goals of not only competency-based medical education but also competency-based medical practice.

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[1]Medical Council of Canada, Ottawa, Ontario, Canada
[2]University of Ottawa, Ottawa, Ontario, Canada
[3]Center for Research and Development of Education, University Medical Center, Utrecht, the Netherlands

Correspondence: Claire Touchie, Medical Council of Canada, 2283 St. Laurent Boulevard, Suite 100, Ottawa, Ontario K1G 5A2, Canada. Tel: 613 521 6012 ext. 2543; E-mail: ctouchie@mcc.ca

INTRODUCTION

Ten years ago, we predicted that the start of the 21st century would be remembered by medical educators as the decade of competency-based training in medicine.[1] It has indeed turned out to be an era of consolidation of competency-based medical education (CBME) in many countries, which evolved from an educational concept into regulations and legislations. Hundreds of thousands of faculty members, residents and medical students across the globe are now so familiar with the language of competencies it is as if it has always guided medical education. However, concepts and practice are two very different things. Change in medical curricula, formerly considered as difficult as moving a cemetery,[2] now happens rapidly, forced by societal demands and regulations, change in clinical practice, shifting norms for working hours, scientific knowledge accumulation and technological advances. During the ongoing implementation of innovations such as competency-based training, medical educators experience difficulties and must adapt, while still maintaining high standards of ongoing clinical care and education. So has medical education now, in 2016, finally reached that satisfactory stage of consolidated, evidence-based educational programmes that ensure competent graduates? No, it has not, and despite its promise and huge efforts, competency-based medical training continues to be criticised in the literature.[1–5] Why is that? Has medical education gone down a wrong path? Which developments may reconcile the disparate views on the future of medical training? In this personal viewpoint, the authors consider the promise of CBME, examine some of the problems identified and discuss the potential for progress in moving forward.

THE PROMISE

Competency-based medical education has been defined as 'education for the medical profession that is targeted at a fixed level of proficiency in one or more medical competencies'[6] and 'an approach to preparing physicians for practice that is fundamentally oriented to graduate outcome abilities and organised around competencies derived from an analysis of societal and patient needs; it de-emphasises time-based training and promises greater accountability, flexibility, and learner-centredness'.[7] Two features of CBME stand out: (i) a redefinition of what a competent doctor is and (ii) a focus on securing competent graduates. Although the general gestalt of what a doctor *is* had never required a detailed specification, the substantial changes in health care practices in the last half century are no longer compatible with that traditional picture. By the end of their training, medical practitioners become a variety of medical specialists and subspecialists with a decreased common identity, common practice, common language and common understanding of patient problems. In current health care systems, diagnostic and therapeutic options have multiplied in a way that no single practitioner can oversee, requiring much more collaboration and communication. Consequent lapses in care and patient safety issues have added to the urgency to redefine the medical practitioner and to make sure their education guarantees competence.

The Royal College of Physicians and Surgeons of Canada (RCPSC) took the initiative in 1996 to define the multiple roles of the doctor of a new era, with the support of significant societal stakeholders. The resulting CanMEDS framework was quickly recognised in many other countries and implemented or adapted. This redefinition was supplemented in 1999 by the Outcome project of the US Accreditation Council for Graduate Medical Education (ACGME)[8] following a recommendation dating back to 1978: 'The intended outcome is a health-professional who can practice medicine at a defined level of proficiency, in accord with local conditions, to meet local needs'.[9] The move to competency-based medical education has been called a paradigm shift[10,11] holding great promise for safer and higher quality health care.

THE PERILS AND PROBLEMS

The perils of CBME may be best summarised with Leung's words. 'If applied inappropriately, [competency-based training] can result in demotivation, a focus on minimum acceptable standards, increased administrative burden and a reduction in the educational content.'[12] The risks authors see may be categorised into problems of a conceptual nature, assessment nature and practical nature.

Conceptual issues

Both Grant and Brooks have eloquently warned that competency-based training is a reductionist approach, rooted in behaviourism. 'Behavioural objectives, or competences, can never describe complex human behaviour. The sum of what professionals do is far greater than any of the parts that can

be described in competence terms.'[1,3] Brooks goes on to say that 'medicine is fundamentally a moral pursuit.[3] At its heart is the physician-patient relationship, a relationship between two people. The atomistic and action focused concept of competency does not embody this view of medicine'. Hodges describes the CBME movement as a shift from a 'tea-steeped' doctor trained using a time-based programme, to a factory-produced i-Doc emerging from a competency-based programme.[13] In a recent volume called *The Question of Competence*, Leung et al.[14] explain how the 'competent mind' of the doctor also includes qualities such as situation awareness, metacognition, attentive automaticity and shared or distributed cognition in collaborative work, not easily captured in measurable competencies. This conceptual criticism may be summarised as acting against the analytical approach to doctor competence, with the desire to train and assess (just) its detailed component parts, while ignoring the synthetic or holistic concept of the doctor as a whole.[15]

Assessment issues

In a systematic literature review, Lurie et al.[16] found no instruments that can validly assess competencies and conclude in a later commentary that 'although competencies may prove useful in defining an overall social mission for organisations, such competencies should not be mistaken for measurable and distinct attributes that people can demonstrate in the context of their actual work'.[17] Brooks comments that:

> 'the competency model—which tends to be top-down and prescriptive—does not provide the framework for objective educational assessment that it claims to provide... I, like all other practicing physicians, know other physicians whom I wouldn't let near me or my family members, regardless of the number of pieces of paper they might sport. Conversely, I know a number of physicians who are superior to me in my chosen field, despite the fact that they lack the subspecialty certification that I have'.[3]

Practical issues

Brook's comment resonates with others who experience the practice of competency-based training as checking boxes on checklists rather than assessing the outcome of training in preparation for practice.[2,5] Malone and Supri comment that CBME is bureaucratic and burdensome, and requires extensive written materials with forms and checklists, 'devaluing the role of educators into that of form-filling

bureaucrats'. They also comment on the risk that CMBE limits broad medical curricula to knowledge and skills that prepare for measurable competencies, and educators will 'teach to the test'.[18] Others have commented on the focus on minimum standards, on the rationale for predominantly serving regulators rather than students, and on the implicit assumption that CBME will reduce the length of training.[4] Though not often mentioned in the literature, organising time-flexible programmes also poses immediate and immense logistical difficulties, as training and service are intertwined.

THE PROGRESS

Despite 15 years of substantial criticism, the vast majority of the medical education community has supported the development of CBME. The reasons seem clear. Society, health care and the context of medical education have changed and education programmes simply *must* respond to this. It is not that critics do not have their points. Most of the comments bear truth, but virtually none of the comments include a clear way forward; most of them actually implicitly recommend *no* change, or the reinstatement of apprenticeships.[3] A recent charter on CBME stresses the continued need to focus medical training on population health needs, on valuing outcome rather than only the process of education and on the formation of the doctor across a continuum of education, training and practice.[19]

Although programmes continue to implement CBME, new concepts to support the higher goals of competency-based education and assessment have emerged, namely milestones and entrustable professional activities (EPAs).[20,21] These concepts are intended to help bridge the gap between the theoretical constructs of competence and the practicalities of education, assessment and clinical practice. Do these developments in any way address the concerns voiced in the literature?

Milestones

'Milestones', concrete behavioural descriptions aligned with developmental steps in one domain of competence, to assist clinicians in the assessment of medical trainees, is terminology introduced by the ACGME to establish a 5-step logical trajectory of professional development within competencies. Developed as benchmarks for effective assessment,[21] ACGME milestones are written for all postgraduate medical disciplines in the United States of America

(USA) were published in the *Journal of Graduate Medical Education* in March 2013 and March 2014. They are short descriptions of typical resident behaviours at sequential stages of training, following matriculation into a specialty, targeted at an advanced level for graduation to practice (Level 4, proficient), and ending at an aspirational level to be achieved only by exceptional residents (Level 5, expert).[22] Specialty milestones are the framework for annual reports on a resident's progress.

The RCPSC followed this course by introducing milestones into the CanMEDS 2015 version, defined as 'descriptions of the abilities expected of a trainee or physician at a defined stage of professional development' of each of the 'enabling competencies' under the seven CanMEDS competency roles, to guide learners and educators in determining whether learners are 'on track'.[23] Whereas ACGME milestones have been designed by specialty associations, the RCPSC suggested that milestones are general, being described in one document as applicable across all specialties. Unlike the USA milestones, the CanMEDS milestones are bound to seven predefined stages of the educational continuum (medical school fundamentals, early clinical activity, transition to discipline, foundations of discipline, core of discipline, transition to practice and continuing professional development).[23]

Entrustable professional activities

Ten Cate and Scheele have proposed entrustable professional activities (EPAs) as a more holistic approach to workplace curriculum development and assessment.[24] EPAs are broad units of professional practice (i.e. 'tasks or responsibilities to be entrusted to the unsupervised execution by a trainee once he or she has attained sufficient specific competence').[25] An example of an EPA is *conducting an uncomplicated delivery*. This activity, performed by family doctors and obstetrics-gynaecology specialists, needs to be entrusted to a trainee at some point in their training, as the trainee eventually will need to conduct it without supervision; it requires specific knowledge, skills and behaviours; proficiency is acquired through training; it is directly observable and reflects competencies.[20] As this activity particularly reflects the CanMEDS roles of medical expert, communicator and collaborator, it exemplifies how EPAs integrate competencies. EPAs are proposed to be the focus of assessment. Even a simple activity such as 'taking a history' illustrates how inextricably communication, professionalism, medical knowledge and clinical reasoning skills are integrated within a conversation with a patient. Assessing any of these competencies separately is meaningless, whereas assessing the task as a whole within a context is sensible.

A comprehensive set of EPAs can thus cover the core of a profession or cover focus areas of subspecialty practice. Allied to the EPA concept is the process of entrustment decision-making. Entrustment serves to acknowledge ability, and provide permission to act unsupervised and to enact duties in health care practice. True competency-based medical education grants certification as soon as competence is adequately demonstrated. EPAs allow decisions regarding entrustment to be made for separate units of professional practice, resulting in a gradual, legitimate participation in professional practice, rather than on the last day of training. It transforms traditional assessment into entrustment decisions as a frame of reference.[26] As trust increases, the level of supervision can decrease. A model of five levels of supervision and entrustment has been suggested for postgraduate training[24] and, with adaptations, for undergraduate medical education. These are illustrated in Box 1, based on Chen *et al.*[27]

EPAs have rapidly become popular within both postgraduate and undergraduate medical programmes,[28–37] but extensive reports on implementation and outcome are still rare.

REFLECTION

Where does competency-based medical education stand in 2016? Will the new approaches be accepted in the long term, improve training and lead to the promised higher levels of quality and safety in health care?

Making predictions is difficult. Practicalities of implementation can make or break a programme. We believe that if the concepts of milestones and EPAs are not well integrated with competencies and with each other, constituting a coherent model of education in the workplace, criticism may increase. Doubts about the milestones and EPAs have been raised.[38–40] Many authors have warned of the risk of a reductionist view of competencies and the lack of a holistic approach to medicine, and the fundamental limitations of capturing the competence of a doctor in scores and numbers. Clearly this is not the way to go. If milestones and EPAs serve as the new checklists, we have not won anything.

Box 1   Levels of entrustment

|		Undergraduate Medical Education	Postgraduate Medical Education
Level 1	Not allowed to practise EPA	Yes	Yes
	1 Inadequate knowledge/skill; not allowed to observe		
	2 Adequate knowledge, some skill; allowed to observe		
Level 2	May act under proactive, ongoing, full supervision	Yes	Yes
	1 As coactivity with supervisor		
	2 With supervisor in room ready to step in as needed		
Level 3	May act under reactive supervision	Yes	Yes
	1 With supervisor immediately available, all findings double checked		
	2 With supervisor immediately available, key findings double checked		
	3 With supervisor distantly available, findings reviewed		
Level 4	May act unsupervised	–	Yes
Level 5	Allowed to supervise others in practice of EPA	–	Yes

EPA - entrustable professional activities

However, if the concepts of competencies, milestones and EPAs are well integrated, and provide space for feasible, holistic expert judgement of a learner's progression, then the chances are that medical education has truly made progress. This integration can be envisioned. EPAs, as units of professional practices, by definition already map competencies. Elaborated EPAs detail which competencies must be present before a learner can be trusted to act unsupervised. Milestones also map competencies. The USA version of milestones describes the development of the learner in specialty-specific competencies, related to the five Dreyfus stages (novice, advanced beginner, competent, proficient and expert).[22] Coincidentally, the levels of supervision related to decisions about EPAs, also show development in five steps (observation, direct supervision, indirect supervision, distant supervision and providing supervision). In addition, the focus on the fourth level as the target for unsupervised practice for any learner and the level 4 milestone also align, whereas level 5 on both scales reflects an aspiration that is not required for all graduates. It is not surprising that some programmes in the USA have equated both scales. Eric Warm, program director of the internal medicine residency program in Cincinnati, Ohio, did exactly this. He was able to engage many clinicians in rating residents and showed developmental progression of individual residents over time.[41] This operational integration of

EPAs, competencies, milestones and levels of supervision is depicted in Fig. 1, borrowed from Ten Cate et al.[42] What the figure shows is how an EPA requires specific competencies; these may be evaluated using the descriptions of behavioural milestones. If both competencies match (e.g. at the level 3 milestone), then a conclusion may be drawn that the learner is ready for indirect supervision (Fig. 1).

This all sounds rather mechanistic, as if a machine can draw a conclusion. In practice, however, the sequence of events can be simple and very humanistic. A supervisor's judgement about the readiness for indirect supervision of a learner is likely to be made first, after which an optional check with a milestone description can confirm the judgement, much like the process of clinical reasoning about a patient's case. First a hypothesis comes to mind, then a verification takes place.

The integration of EPAs, competencies and milestones also serves to further combine the processes of evaluating learners and organising clinical care.[43] In many clinical contexts, entrustment decisions resulting in decreased supervision happen every day. The 'I can probably leave this student/intern/resident/fellow alone' thought is often based on prior credentials and global first impressions, recently referred to as presumptive trust and
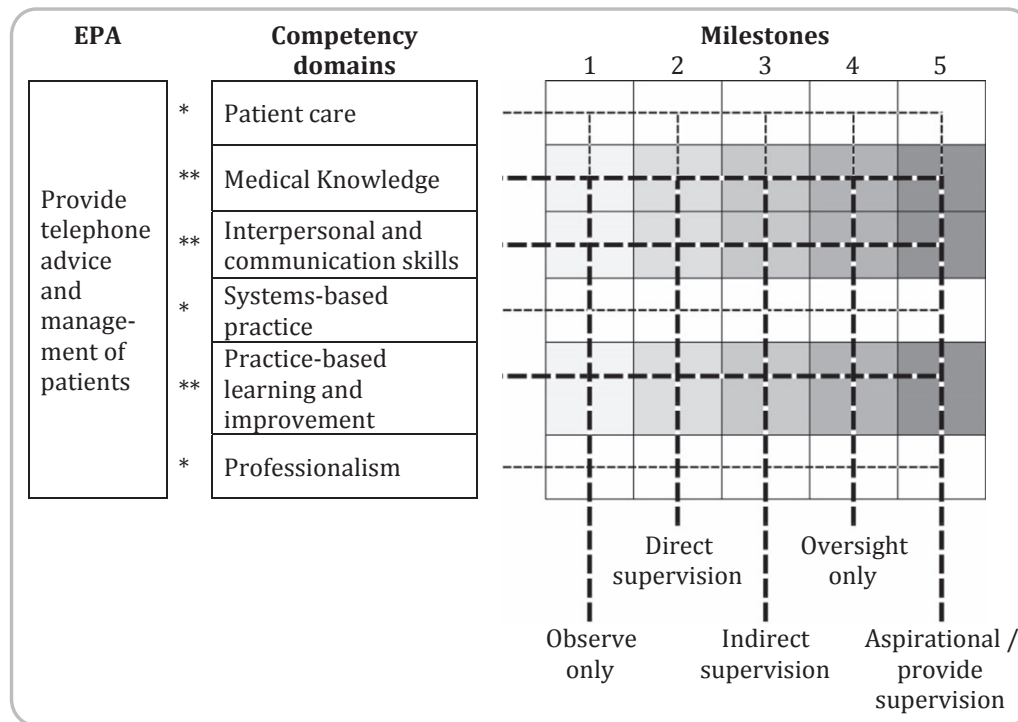
Figure 1 Link between EPAs, competency domains and milestones. ten Cate, O *et al*, Medical Teacher, 2015; Early on-line: 1–20, copyright c 2016, Informa Healthcare. Reproduced with permission of Informa Healthcare.

initial trust.[26] A summative entrustment decision, formalising a further step toward autonomy, acknowledges not only ability, but also the right and duty to act. Summative entrustment decisions about EPAs in health care are like a new driver's license. From that moment on, the learner is being trusted to act unsupervised. Trust involves accepting a risk of driving in heavy traffic, as well as working in a busy clinic, as not all situations can be foreseen or observed. Competence is thus open ended; one cannot specify in advance the range of possible presentations of heart failure.[44] Despite all the effort put into competencies and milestone descriptions, true entrustment decisions are in part holistic and based on gut feeling. The grounding of trust through observed behaviour and rated evaluations can only partly support the validity of entrustment decisions. Much is based on expert, collegial judgement, which is inherent to professional education, and requires adequate supervision and mentoring. Summative entrustment decisions should lead to STARs (Statements of Awarded Responsibility[24]) with an expiration date.[42,45] A deliberate entrustment process essentially makes the everyday implicit entrustment decisions more explicit, and aligns education and assessment better with clinical practice.[43,46–48]

Given the major developments in undergraduate and postgraduate education, and the desire to graduate medical trainees based on what they can actually do in practice, a portfolio of EPAs that reflects his or her current acknowledged abilities is a small step forward in defining a doctor's competence. With core entrustable activities defined, doctors at entry to residency have a concrete, expected competence that programme directors should be able to rely on, optionally supplemented with additional elective EPAs that the most advanced students have also been able to master. A single diploma or registration may not be sufficient to portray the rich variations in competence that medical students and residents graduate with. The authors hypothesise that it is likely to be simply a matter of time before all medical students, residents and practising doctors use an electronic portfolio to attest competence. Supervisors, employers, colleagues, other health care professionals and maybe even the public could have access to documentation translated into EPAs with STARs. The core EPAs of doctors and specialty EPAs could reflect license and eligibility for registration. In addition, elective EPAs can be added during or after training. Indeed, although discussions about maintenance of professional competence and certi-

fication show dissatisfaction with current models[49–51], recertification could also be based on EPAs. There should be no shame in losing EPA certifications if activities are simply never practised, and there should be value in adding certification for new EPAs, thus resulting in a portfolio of EPAs that reflects the full, true, current competence that the public can trust the doctor possesses.

A future in which a doctor's competence is defined by a transparent, dynamic portfolio of EPAs, genuinely reflecting actual competence, may well serve the quality and safety of patient care. This may extend competency-based medical education into *competency-based medical practice.*

CONCLUSION

The implementation of CBME requires a changing perspective on the needed outcomes for safe and effective medical care. The authors believe that milestones and EPAs can help in developing curricula and assessments that train doctors in the qualities needed for competent practice.

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