Toward a Glossary of Competency-Based Medical Education Terms

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Competency-based medical education (CBME) is now the standard for physician education, highlighted by the implementation of competency-based Milestones[1] at the graduate medical education level for all specialties by July 1, 2014. However, transitioning to CBME has been both difficult and bewildering, particularly as a student seeking assurance that my medical school education is preparing me to succeed in a competency-focused residency program. Even understanding CBME literature is difficult for a newcomer to the education field. Terms, such as *competence* and *competency-based medical education* are frequently used, but lack consistent definitions.[2,3] What is really meant when my attending tells me I am *competent* or even, *dyscompetent* or starts talking about *Milestones*? Scholars also recognize this problem—individual authors and collaborators have worked to review term usage and promote universal definitions.[4–6] However, those definitions have not been widely adopted, as evidenced by the continued reframing of terms in subsequent articles. To address this issue, we first identified "key elements" of commonly used CBME terms and used those elements to create a succinct definition for each term.

Methods

We used a 2-step approach: (1) we conducted a literature search for terms and associated definitions within CBME manuscripts, and (2) we identified frequently cited articles, key term elements, and associated definitions.

Step 1: Survey and Search Strategy for CBME Terms

A preliminary literature review on CBME using the terms *competency* and *competency-based education* yielded a set of repeatedly used terms. Those terms were used to frame our formal literature search. The period searched for each term depended on the presence of review articles containing compiled definitions from the preceding literature: *competency* and *competency-based medical education*[4,5] were searched starting from January 1, 2010, with the search frame ending for all terms on December 31, 2012.

Each term was searched individually (TABLE 1) in the following databases: CINAHL with Full Text, MEDLINE, Health Source: Nursing/Academic Edition, Academic Search Premier, Education Research Complete, Educational Administration Abstracts, ERIC, and MasterFILE Premier.[3,4] Use of Boolean phrases narrowed the search to the field of medical education. Four article inclusion criteria were selected to create a feasible review strategy given the explosion of literature in CBME: (1) published in a peer-reviewed, English-language journal; (2) retrievable without cost (eg, medical college library, interlibrary access); (3) set in the continuum of medical education (undergraduate, graduate, or continuing); and (4) included the definition of the term under consideration (whether original or citing another source). Relevant articles from the literature on nursing and physician assistant education retrieved during the literature search were also included.

Definitions from articles fitting the inclusion criteria were extracted from the original text and compiled into a Word document. If review articles presented multiple definitions from previous literature, those definitions were also extracted. *Competency* and *competence*, although different terms, were often defined interchangeably in the literature, with only a few authors specifically addressing the difference.[2] Thus we used the search term *competenc** to include definitions for both words, and compiled them under the term *competency*.

Step 2: Key Terms and Definitions

We examined the definitions for each term extracted from the literature to create a key elements list for each term.

To serve as benchmarks for growth of the field, we identified frequently cited articles using Google Scholar "cited by" data as of December 31, 2012, which included citations by scholarly articles, educational programs, curricula, and journals that may not have been indexed using other search engines. Articles were

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TABLE 1 **Competency-Based Medical Education (CBME) Search Terms Presented by Number of Articles Meeting Inclusion Criteria and Unique Definitions**

CBME Term	Boolean Phrase	Articles (Duplicates Excluded), No.	Met Inclusion Criteria, No.	Unique Definitions, No.
Competency	competenc* AND medical education AND definition	27	6	20
CBME	competency based education AND medic* AND defin*	69	13	9
Dyscompetence	dyscompeten*	1	1	1
Enabling competency	enabling competen*	7	1	1
Entrustable professional activities	entrust* professional activit*	6	5	2
Facet of competency	facet of competenc*	6	1	1
Meta-competency	meta-competenc*	31	3	1
Milestone	milestone AND medical education	32	5	2

considered frequently cited if they were cited 70 times or more.

Results

Eight CBME terms consistently appeared in the literature: *competency*, *competency-based medical education*, *dyscompetence*, *enabling competency*, *entrustable professional activities*, *facet of competency*, *meta-competency*, and *Milestone* (TABLE 1). Although multiple articles were retrieved for each term, only a few contained definitions (inclusion criteria No. 4). Four terms had definitions that drew on previous literature: competency-based medical education, entrustable professional activities, meta-competency, and Milestone. For example, the search for the term *Milestone* returned 32 articles without duplication, 5 of which fit the inclusion criteria (eg, had definitions). Although 3 of those 5 articles (60%) drew on a single reference[7] to define *Milestone*, more typically authors defined terms without reference to previous work.

We identified 7 frequently cited articles (≥ 70 citations) as of December 31, 2012, including 2 review articles. Frequently cited articles were distributed across 5 journals with *Academic Medicine* and *Medical Teacher* each publishing 2 articles (TABLE 2). To confirm that those

TABLE 2 **Comparison of Citation Frequency for Frequently Cited Articles From Initial Search Containing Competency-Based Medical Education (CBME) Term Definitions to 1 Year Later**

Most Cited CBME Articles Using Google Scholar Cited by	Cited as of December 2012, No.	Cited as of December 2013, No.
Epstein RM, Hundert EM. Defining and assessing professional competence. *JAMA*. 2002;287(2):226–235.	1273	1522
Carraccio C, Wolfsthal SD, Englander R, Ferentz K, Martin C. Shifting paradigms: from Flexner to competencies. *Acad Med*. 2002;77(5):361–367.	309	368
Harden R, Crosby J, Davis M, Friedman M. AMEE guide No. 14: Outcome-based education, part 5—from competency to meta-competency: a model for the specification of learning outcomes. *Med Teach*. 1999;21(6):546–552.	163	206
Cowan DT, Norman I, Coopamah VP. Competence in nursing practice: a controversial concept—a focused review of literature. *Nurse Educ Today*. 2005;25(5):355–362.	104	139
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.	104	170
Leung WC. Competency-based medical training: review. *BMJ*. 2002;325(7366):693–696.	163	205
Frank JR, Snell LS, ten Cate O, Holmboe ES, Carraccio C, Swing SR, et al. Competency-based medical education: theory to practice. *Med Teach*. 2010;32(8):638–645.	70	145

TABLE 3 **Competency-Based Medical Education Terms, Associated Key Elements, and Proposed Term Definition**

Term	Key Elements	Proposed Definition Incorporating Key Elements
Competence/competency	▪ Performance-based ▪ Abilities ▪ Integrated and contextualized ▪ Application of knowledge and skills (not acquisition) ▪ Judgment (knowing when) ▪ Task ▪ Requires observation of performance	▪ Ability to perform a task to a defined level of specification
Enabling competency	▪ Specific to CanMEDS roles (communicator, collaborator, scholar, manager, health advocate, and professional) ▪ Intermediary step to competency ▪ > 1 enabling competency is required to attain a key competency	▪ A subset of a broader competency that is achieved first in step-wise fashion
Facet of competency	▪ Qualities possessed by the trainee ▪ Components of the Miller pyramid (knows, knows how, shows how, does) ▪ Gives supervisor confidence to trust trainee to complete a certain task (eg, an EPA)	▪ Component of competency that precedes ability to fully perform all aspects of a task
Meta-competency	▪ Higher-level (ie, multidimensional attributes) ▪ Specific ability to apply competency in a variety of situations	▪ Overarching concept emphasizing the ability to appropriately perform tasks in different situations
Competency-based medical education (CBME)	▪ Focused on educational outcomes ▪ Independent of methods and time ▪ Composed of achievable competencies	▪ Medical education that focuses on outcomes: upon completion of the program, students must be able to perform certain tasks
Dyscompetence	▪ Not performing at necessary level for professional practice ▪ Not meeting competency in > 1 domain	▪ Inability to achieve at the expected performance level for that level of training
Entrustable professional activities (EPAs)	▪ Observable tasks ▪ Descriptors of work/responsibilities ▪ Require level of knowledge, skill, and ability ▪ Requires multiple competencies ▪ Supervisors determine whether trainee possesses the qualities to successfully complete task ▪ Dependent on trust and supervisor-trainee relationship ▪ Opportunity for feedback	▪ A responsibility that can be entrusted to learner in the workplace
Milestone	▪ Progression toward competency, developmental progression ▪ Guide professional trajectory to achieving competence ▪ Precursor to EPA	▪ A marker (or series of markers) denoting progress toward achieving competence

articles continued to have impact after our key elements abstraction, we completed a second Google Scholar citation search, dated December 31, 2013, for comparison. We found an increase in the number of article citations, ranging from 35 to 249 new citations in a 1-year period (19%–107% increase).

From the retrieved definitions for each term, we identified key elements, drawing on only the 2010–2012 search results. Terms possessed between 3 and 7 elements. We used an iterative process to coalesce the key elements for each term to form a succinct definition (TABLE 3).

Discussion

As a medical student, I am surrounded by educational programs claiming to be "competency-based." Yet our study showed that, although CBME terms were frequently used in the literature, they were rarely defined. When authors did attempt to define terms, they often promoted their own definitions without citing those that had been

previously proposed, adding to the confusion. The lack of clear, cogent definitions for CBME terms is confusing to established educators, as well as medical students, who are seeking to judge whether a residency has "the competencies" and "Milestone" assessments in place.

Our search and analysis of definitions resulted in several key elements for each term, reflecting a wide breadth of inherent meaning. We sought to create succinct definitions for each term based on key elements to help establish a glossary for commonly used CBME terms. Adding the advanced beginner's[8] perspective on the key elements associated with CBME terms further enriches the definitions.

Our approach has several limitations. By design, our definitions were limited to the peer-reviewed literature, thereby excluding definitions in other educational materials. The accuracy of the term's key elements and definitions are limited because they were analyzed only by the authors. These would be strengthened through confirmation from independent reviewers, an expert panel, and/or a Delphi process to achieve consensus. That said, we recognize the original intent of a term often evolves with practice because language has both descriptive and constructive functions.[9]

Conclusion

We present time-stamped definitions for selected CBME terms to expedite the volition toward a common terminology. As we embark on the Next Accreditation System and the educational Milestones, periodic redefinition of commonly used CBME terms will enhance our ability to examine and communicate our underlying assumptions and strategies to trainees, faculty, program directors, and other stakeholders.[10] As a soon-to-be resident, I look forward to hearing my staffing physician say, "Congratulations, you are competent, moving to proficient" with assurance that those terms mean the same to both of us.

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