

ONLINE APPENDIX — Table 3. Summary of included definitions

| Year | Author | Source and definition (M = MEDLINE, EM = EMBASE, ER = ERIC, G = Google, R = Reviewer nominated, SRL = Reference list) |
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| 1973 | Brown, TC | M (VB)* (1) a general system theory that permits more <i>precision</i> and possibly more rigor; (2) formats that permit <i>individualization and non-time-bound</i> competency attainment; (3) methodologies that provide <i>alternative routes to competence</i> ; (4) evaluation models with the potential to of measuring competence qualitatively rather than quantitatively; (5) interdisciplinary cooperation – medical education and administration; management, public administration, etc. – that requires more <i>specificity</i> and <i>clarity</i> of training; (6) improved linkages with the field make possible needed assessment, reality-oriented experiences, validation of program components, etc., increase expectations for relevance, and increase recognition of legitimate means of continuing competency attainment once the field of practice has been entered. |
| 1973 | Kane, R | R (SS)† The initial step in constructing an end-product description called for a crude task analysis of appropriate behaviours in the practicing family physician. This format ... includes three major headings: skills, knowledge and attitudes. These can be further sub-divided into a variety of tasks, skills, procedures, or content areas related to the delivery of comprehensive care by physicians ... It should be emphasized that this approach focuses on what competencies are needed rather than on what should be taught from a given discipline. |
| 1976 | Russel, ML | M (SS) The competency-based model for training requires that the content of training ... be clearly defined. Since knowledge and skill areas are prespecified, a wide variety of instructional settings and teaching techniques are possible ... while the competency-based model requires pre-specification of the training offered, the theoretical approach to consultation-liaison work remains flexible ... the flexibility to select instructional settings most appropriate for particular training. |
| 1976 | Weinstein, HM | M (SS) The focus of training in a competency-based residency program is on ensuring that all residents attain prespecified levels of competence for particular objectives in each training activity ... the competency based training model directly faces the issue of certifying competence by holding itself accountable in a demonstrable way for ensuring that its residents have mastered specific areas of knowledge, skills and attitudes ... The time for completion of training is allowed to vary for the individual resident within the 3-year period ... Performance objectives have been grouped under three headings: knowledge (what the resident needs to know), skills (what the resident should be able to do) and attitudes (the personal characteristics that the resident should develop) ... The competency-based system of training therefore makes certain that the learners and teachers are clearly aware of the goals of training (i.e. they know what is to be evaluated ... and how they will be measured)... assessment in a competency-based training program is criterion-referenced and specific to the resident ... the resident's abilities are evaluated in relation to a prespecified set of behaviours ... Assessment in a competency-based training program requires the determination of whether a resident has successfully mastered the prespecified objective. |
| 1977 | Broski, D | SR L (SS) A competency-based curriculum ... is a purposefully provided vehicle for ensuring that learners possess pre-determined professional attributes ... Although the definitions of a competency-based curriculum vary widely, they seem to hold a few elements in common. 1. Competencies are derived from an assessment of the knowledge, skills and attitudes needed to perform in the professional role. 2. Competencies are stated in behavioral terms. That is, behaviors or their indicators are observable and measurable. 3. Competencies are public. Students, as well as instructors, are informed as to the behaviors to be mastered. 4. Achievement of competencies is evaluated in a criterion-referenced manner. Learners are compared to performance standards rather than to other learners. 5. Instruction is self-paced. Time is allowed to vary while performance standards are held constant. 6. Learners must demonstrate mastery of prerequisite behaviors before proceeding to subsequent behaviors. 7. Learners are provided instructional alternatives appropriate to their learning style and/or preference. 8. Instruction is organized in related units called modules – each intended to enable the learner to master a competency or set of competencies. |
| 1977a | Haupt, JL | M (SS) The competency-based model ... specify the requisite areas of knowledge, skills and attitudes ... requires the development of more delineated approaches to training, as well as methods to evaluate the success of the program in terms of how closely the training approximates the statements of competence in each area ... This educational model provides faculty with explicit objectives ... The focus of training rests on ensuring that the resident masters the important core or basic skills and knowledge needed. |

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| 1977b | Houpt, JL | M (VB) This model emphasizes behavioral definitions of competence which require specification of the areas of knowledge, skills and attitudes that a trainee must master to be considered competent at the end of training ... Evaluation based on behavioral objectives. |
| 1978 | Ford, CW | G (SS) Competency-based education is the designing of a course, program, or curriculum on the basis of what the student is supposed to learn to do ... The task lists are used for identification of the specific competencies needed within the profession. Competency-based education arises out of the development, teaching, and evaluation of these competencies. At this point, performance objectives must also be developed to help specify these competencies. |
| 1978 | McGaghie, WC | M (SS) Organized around functions (or competencies) required for the practice of medicine in a specified setting ... grounded in the empirically validated principle that students of the intellectual quality found in medical schools ... can all master the prescribed basic performance objectives ... education as an experiment where both the process of student learning and the techniques used to produce learning are regarded as hypotheses subject to testing ... the output of a competency-based programme is a health professional who can practise medicine at a defined level of proficiency ... competence includes a broad range of knowledge, attitudes and observable patterns behaviour which together account for the ability to deliver a specified professional service. |
| 1978 | McLean, P | M (SS) The practice of shaping residents to the appropriate performance criteria rather than examining them once to see if they are acceptable ... the goal performance criteria, that is, the knowledge, skill and judgment needed ... be explicitly defined so that progressive training and performance steps can be articulated in such a way that there is little dispute as to where one's ability currently lies on these knowledge, skill and judgment dimensions ... continuous development of skills. |
| 1978 | Russel, ML | M (VB) Competency-based instruction organizes the educational activities in a training programme around a set of objectives that clearly specify what the student is expected to know, do, or have experienced prior to the end of the programme. These objectives are directly linked with methods of assessment so that the educational progress of each student can readily be monitored. The student must demonstrate mastery of each objective at a pre-specified level to complete training in a given area. |
| 1981 | Botticelli, MG | M (VB) (1) The knowledge, skills, and attitudes required by a beginning resident in internal medicine are definable and can be stated as specific educational objectives. (2) The fulfillment of these objectives by a student is measurable and defines competence for a graduating medical student. (3) Mastery of these objectives, rather than time, signifies satisfactory completion of the clerkship. |
| 1981 | Segall, A | M (SS) A competency-based approach ... educational objectives emerging from the project would reflect capabilities which will be needed by students in their future professional roles. |
| 1982 | Giovannini, MJ | EM (SS) Curriculum should be competency-based, i.e. grounded in an analysis of the job requirements and real life situations which health care personnel will confront ... explore the practical applications of theoretical and substantive knowledge in actual health care planning and delivery contexts. Hence, training should be "experiential" in character, giving trainees guided experience in real life or simulated work settings. |
| 1983 | Smith, DM | EM (VB) Approach in designing research and training programs is to (a) identify patients' problems deserving attention, (b) define a competency level judged to be required to handle these problems, (c) determine if the trainees have attained the required level of competency, and (d) add educational experiences in areas where the level of competency is found to be inadequate. |
| 1987 | Gaskins, SE | M (SS) Curricula based on competency in defined skills rather than subject content and evaluation by criteria linked to the competencies rather than standardized examinations ... In such a curriculum, the skills and attitudes necessary ... are analyzed, the specific competencies or behaviours that demonstrate these skills are defined and the resident is required to document that these competencies have been achieved ... Evaluation is criterion-referenced rather than norm-referenced; that is, the resident must document mastery of the specific criteria deemed necessary to demonstrate competency rather than achieve a minimum score on a standardized examination. |
| 1989 | Fisher, LA | SR L (VB) Curricular purpose defines the activities, or the kinds of activities, that the graduating student is expected to perform, the circumstances under which these activities take place, the minimal degree of competence that is acceptable, and the criteria by which this minimal competence is assessed. Such detailed and well-focused statements are often called instructional objectives. |

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| 1992 | Doherty, M | EM (SS) It is often more convenient to consider problem-orientated requirements in terms of 'competencies' (i.e. clusters of skills, attitudes, and knowledge) ... [In a] "competency-based" system the students play an active role in learning, obtaining the information they need to solve problems assigned to them. |
| 1993 | Craton, N | EM (SS) A fourth method of curriculum planning and one of the most commonly used approaches which has emerged in the past 20 years is the "competency-based" method. This type of curriculum organization is dependent on a determination of what a practising physician should be able to competently do at the end of his or her training by first assessing the specific competency needs facing a physician in clinical practice ... It also permits the acquisition of skill and knowledge in a cumulative fashion. |
| 1993 | Gonnella, JS | M (SS) The medical profession should be able to demonstrate that it is educating physicians who can translate their knowledge into performance, recognize their limitations, learn from their mistakes, keep up with advances in science and technology and ultimately provide high-quality care at a reasonable cost for the patients they serve ... Physicians have many obligations, and to discharge them they must acquire a variety of competencies ... components of knowledge, cognitive abilities, psychomotor skills, and personal qualities. |
| 1994 | Hager, P | R (SS) Competency-based assessment is the assessment of a person's competence against prescribed standards of performance ... Competency-based assessment is the process determining whether a candidate meets the prescribed standards of performance, i.e. whether they demonstrate competence ... competence is conceptualised in terms of knowledge, abilities, skills and attitudes displayed in the context of a carefully chosen set of realistic professional tasks which are of an appropriate level of generality. |
| 1994a | Lane, DS | M (SS) Competency-based education (CBE) ... requires that outcomes of instruction are observable and measurable ... evaluation is directly linked to the behaviors specified in the objectives. Mastery is assessed through direct observation of the learner's activities ... CBE implies that the learners can "do" something at the end of instruction ... Competency pertains not only to subject matter but also to procedural knowledge and judgment. |
| 1994b | Lane, DS | M (SS) CBE is a form of education that derives a curriculum from an analysis of a prospective or actual professional role, and that attempts to certify student progress on the basis of demonstrated performance in some aspects of that role ... CBE requires that outcomes of instruction be observable and measurable. Evaluation is directly linked to the behavior specified in a particular competency definition. |
| 1995 | Lane, DS | M (SS) One cannot equate competent performance on a written test with competent practice ... competency-based education encourages educators to assess mastery of competencies under the most realistic conditions and in the most direct way possible. Assessment methods should directly involve the resident to the greatest extent possible. |
| 1996 | Churgay, CA | M (VB) The use of formal, objective criteria for the certification of competency instead of requiring a specific number of procedures to be performed. |
| 1996 | Smith, SR | M (VB) The competency-based curriculum describes the knowledge, abilities, and personal values that define a successful graduate. Faculty determine if these students have achieved mastery of these competencies through performance-based methods of assessment. |
| 1997 | Bell, HS | M (SS) A true competency-based residency curriculum would make the duration of the residency dependent on the time needed to achieve mastery ... A core-competency based curriculum should define those competencies that are relevant ... yet are flexible and broad enough to enable regional and programmatic variations ... The competencies could also be incorporated into board certification, so that candidates would not only take a written examination but would also demonstrate their ability in defined competencies. |
| 1997 | Greaves, JD | M (SS) A move within general education towards learning and assessment that are focused on the ability of the learner to do the job. These changes toward "competency based education" are fundamental enough to amount to a paradigm shift in education. In this new educational model, assessment is by direct observation of competence ... The expected outcomes of learning are defined as new competencies that can be assessed in action. |
| 1998 | Inui, TS | M (SS) Core competencies for primary care are central to the education of all physicians ... foundation of knowledge, skills, and values that a physician must have to assume meaningful responsibility for the care of patients ... educating physicians will require a significant educational resource package - personnel, clinical programs, courses, and supportive infrastructure for teaching and learning ... These primary care resources will be critical for two distinct reasons: (1) adequate educational experience in clinical medicine ... (2) the competencies that form the core objectives for the general education of all physicians are also the fundamentals of effective primary care. |

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| 1998 | Martin, M | M (SS) As part of a competency-based training system, surgical faculty defined the basic anatomy and steps required for the successful completion of each skill ... Residents were informed of the knowledge and the steps required for mastery of the skill at the beginning of the teaching encounter. They were required to describe the anatomy and potential complications of each procedure and to perform each skill to mastery before "graduating" to patient encounters ... When we evaluate resident performance using expert opinion in the operating room, we come closest here to a competency-based approach to education. We expect the resident to "know" the operation and the patient by reading about the steps and risks involved before ever coming into the operating room ... In brief, development of a competency-based training system should follow a four-step process of curriculum design, instruction, evaluation and faculty development. The end product should (1) derive its design from an analysis of essential skills and their components; (2) require the demonstration of essential knowledge and progression through the components of the chosen domains to a level of predefined mastery; (3) emphasize the individual resident's abilities and needs in the instructional design, providing for specific, focused instruction; and (4) rethink attitudes about and techniques for establishing assessment validity and reliability. |
| 1999 | Ben-David, M | EM (SS) Outcome-based programs are faced with the need to develop non-traditional teaching and assessment techniques, which capture both the learning and performance of broad abilities ... common to all outcomes based curricula is the desire to demonstrate the credibility of the program in terms of what graduates know and can do ... The design of outcome-based education and student assessment must include consideration of expected student outcome as viewed by different consumer groups. |
| 1999 | Freeza, EE | M (VB) The end product should: 1) derive its design from an analysis of essential skills, 2) required demonstration, and 3) emphasize the individual resident's abilities and improve their competency. |
| 1999a | Harden, RM | EM (SS) The emphasis is on the product – what sort of doctor will be produced rather than the educational process. In outcome-based education the educational outcomes are clearly and unambiguously specified. These determine the curriculum content and its organisation, the teaching methods and strategies, the courses offered, the assessment process, the educational environment and the curriculum timetable. They also provide a framework for curriculum evaluation ... [Outcome based education] is an approach to education in which decisions about the curriculum are driven by the outcomes the students should display by the end of the course. In outcome-based education, product defines process. Outcome-based education can be summed up as "results-oriented thinking" and is the opposite of "input-based education" where the emphasis is on the educational process. |
| 1999b | Harden, RM | EM (VB) Increased attention is being paid to the specification of learning outcomes. This paper provides a framework based on the three-circle model: what the doctor should be able to do ("doing the right thing"), the approaches to doing it ("doing the thing right") and the development of the individual as a professional ("the right person doing it"). |
| 1999 | Smith, SR | EM (SS) To give each student the knowledge, skills, values and attitudes that all physicians should have.... By creating a competency-based curriculum, Brown medical school hopes to better assure that it is graduating physicians who possess the qualities and attributes desired in a competent physician ... engenders more active learning ... teachers are more highly engaged in helping students gauge their progress and in identifying and overcoming barriers to their achievement. This developmental process of teaching and learning is most effective when the milestones and end points are known. ... In our competency-based curriculum, we want to create assessments that reflect as closely as possible the actual tasks that students will face as physicians. These assessments need to be authentic and direct. We call this performance-based assessment. |
| 2000 | AAMC | G (VB) Our task is to impart a set of knowledge, skills, and behaviors that <i>all</i> medical students should master regardless of their subsequent specialty choice. The intent was to produce competent and caring physicians - that is, to prepare any graduate to pursue a career in clinical science rather than educating all students to become physician-students. |
| 2000 | Ben-David, MF | EM (VB) Outcome-based frameworks require a defined scheme of levels of progression towards the outcome. Assessment approaches must focus on the definition and evaluation of the progression to ensure that trainees are 'on track'. |
| 2000 | Bienenfeld, D | EM (SS) Checklist of minimum skill competencies ... [as] objective and measurable standards for assessing competency ... Competency requirement domains: assessment and presentation, diagnosis, somatic treatment, side-effect management, provide consultation, psychotherapy ... core behavioral skills mandatory for the competent physician. |
| 2000 | Carlisle, C | M (SS) Many of the allied health professions are working towards competency-based outcomes as a measure of skills acquisition in the clinical environment ... These standards are, where possible, based on current best evidence. Identifying medical competencies in this way would also help ... to maximize the learning opportunities during clinical experience by guiding learning towards explicit outcomes. |

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| 2000 | Corbett, EC | EM (VB) As medical curricula evolve toward a more outcomes-oriented approach, they must strive to more closely match their content to the knowledge, skills, and professional attitudes required of contemporary and future physicians. |
| 2000 | Dunkley, MP | EM (VB) The curriculum is defined either in terms of desired occupational outcomes, or in terms of behaviours, not the underpinning skills or knowledge. Assessment, in a competency-based system, is of performance. It is an assessment of the integration of learning and its appropriate application. |
| 2000 | Long, DM | M (SS) The goal of all graduate medical education is to ensure that the graduating physician is competent to practice ... competency-based training, in which each resident remains in training until he or she has been shown to have acquired the skills and knowledge needed for his or her specialty, and to be able to apply these skills independently and competently to individual patients ... competency-based residency education implies a training process that results in proven competency in the acquisition and application of skills and knowledge to medical practice that is not simply dependent on the student's length of training and clinical experience. |
| 2000 | Maudsley, G | M (SS) Competency-based approaches highlight how prescribed learning outcomes will be assessed, and hence learning needs ... The main assessment challenge for university competence-based approaches is therefore to make 'safe' inferences from knowledge when competence cannot realistically be assessed in all potentially relevant situations. |
| 2000 | Prislin, MD | M (VB) Competency-oriented curricula tend to be multi-dimensional, imparting not only factual knowledge but also clinical skills and professional attitudes. In addition, competency-oriented curricula are frequently multidisciplinary and often integrative or longitudinal. |
| 2000 | Simon, JL | EM (SS) The development of core competencies should logically derive from an assessment of the current health status and needs ... In turn, these competencies should inform and guide the development of curricula for medical students ... the goal of residency education should be to emphasize the knowledge, skills, experience and attitudes necessary for a pediatrician in varied roles. Residents should be educated with a core curriculum so that pediatricians have a common foundation that defines the field ... residency education should remain 3 years in duration. Residency education needs enough flexibility to accommodate a broad range of initial competencies and individual career goals. There should be a future reassessment of the length of training after the development of core competencies and the evaluation of educational outcomes. |
| 2000 | Wojtczak, A | EM (VB) The global minimum essential requirements specify the knowledge, skills and attitudes related to sciences basic to medicine, clinical practice and ethical values, which the medical curriculum should contain to ensure that graduates are prepared to begin further graduate medical education or to start to practice medicine under supervision. |
| 2002 | Beresin, E | M (SS) Use of outcome measures to demonstrate "evidence showing the degree to which program purposes and objectives are or are not being attained, including the achievement of appropriate skills and competencies by students" ... defining the knowledge, skills, attitudes and values that every medical student must demonstrate before graduating ... competencies are defined as abilities to perform complex tasks or functions... before training is initiated, these competencies should be broken down into specific goals and objectives. They should also have specific outcomes that can be measured. Medical education based on competencies differs vastly from the minimal threshold model, which simply describes required clinical rotations and their lengths and clinical procedures, often without specification of the knowledge, skills or attitudes needed for optimal performance. |
| 2002 | Cain, JM | M (VB) [Three] components [describe] how curricula are developed and integrated (1) Needs assessment (2) Goals, objectives, and competencies (3) Instructional design (a) Obtaining buy-in, (b) Tools, (c) Courses |
| 2002 | Carraccio, C | M (SS) A competency-based system defines the desired outcome of training, the outcome driving the educational process ... The elements of competency-based education are best understood when contrasted with the elements of the structure- and process-based system that pervades medical education today ... Competency-based educational program elements: <ol style="list-style-type: none"> 1. Outcome-knowledge application 2. Learner 3. Non-hierarchical 4. Student and teacher 5. Knowledge application 6. Multiple objective measures 7. Authentic (mimics real tasks of profession) 8. "In the trenches" (direct observation) 9. Criterion-referenced 10. Emphasis on formative 11. Variable time |

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| 2002 | Derstine, PL | M (VB) An essential principle of competency-based education (CBE) is use of observable outcomes with assessments as judgments of competence based on defined criteria. |
| 2002 | Folberg, R | M (VB) Competency-based education includes not only the acquisition of knowledge and the demonstration of safe medical practice, but also competency in practice-based learning, practice improvement, interpersonal skills and communication, professionalism and an awareness of pathology's role in a larger health care system. |
| 2002a | Harden, RM | M (VB) Outcome-based education has come to be characterized by: the development of clearly defined and published learning outcomes that must be achieved before the end of the course; the design of a curriculum, learning strategies and learning opportunities to ensure the achievement of the learning outcome; an assessment process matched to the learning outcomes and the assessment of individual students to ensure that they achieve the outcomes; the provision of remediation and enrichment for students as appropriate. |
| 2002b | Harden, RM | M (VB) A second difference between instructional objectives and learning outcomes lies in the level of specification where the emphasis is placed. The major focus in the instructional objectives movement was, as described above, at the level of detailed instructional objectives. In outcome-based education, in contrast, the emphasis rests at a higher level. |
| 2002 | Leung, WC | M (SS) The competency based approach consists of functional analysis of occupational roles, translation of these roles into outcomes, and assessment of trainees' progress on the bases of their demonstrated performance of these outcomes ... a key advantage of the competency approach is its focus on competencies achieved rather than time served ... focus of the competency approach on skills and attitudes rather than a solid understanding of the basic concepts and principles. |
| 2002 | Lindsay, KW | M (VB) An ability to define competencies at these three points in the course of the training period would permit training to become "competence-based" rather than "time-based" – that is, the duration of training would depend on the time it takes to achieve a certain level of competence rather than lasting a prescriptive minimum of 6 years |
| 2002 | Reinhart, MA | M (SS) The goal of a competencies-based system is ... to ensure that specialty practitioners are competent to practice within the scope of the particular specialty ... The new system will serve as an extensive bridge uniting specialty-specific graduate medical education and continuing certification ... common set of standards. |
| 2002 | Simpson, JG | M (SS) Using learning outcomes leads to common-sense curriculum design both by specifying what students are to learn and by providing a clear and unequivocal statement of what the end-product will be like ... three essential elements of the competent and reflective medical practitioner ... technical intelligence ... intellectual, emotional, analytical and creative intelligence ... personal intelligence |
| 2002 | Whitcomb, ME | M (SS) The goal of competency-based [graduate medical education] ... is to ensure that residents are competent ... to be competent means that they are able to provide medical care and/or other professional services in accord with practice standards established by members of the profession and in ways that conform to the expectations of society ... physicians must be able to translate the knowledge, skills, and attitudes they possess into a set of complex behaviors that result in the delivery of high-quality medical care. |
| 2002 | White III, AA | EM (SS) Why not first have each program determine the types of orthopaedists it wishes to produce - the horse? Then, let us learn to recognize the characteristics, competencies, and potential competencies possessed by the applications which, after training, will produce the types of orthopaedists the program wishes to produce - the cart. Directors of residency programs may wish to determine what mix of competencies they wish to have in their fully trained residents. Presumably, all will aspire to produce residents with the skills and competencies to deliver excellent surgical and nonsurgical care to patients with musculoskeletal problems ... The author has noted several intelligences identified by Gardner and hypothesized that these intelligences may be competencies or characteristics of a good or potentially good orthopaedic surgeon. |
| 2002 | Wojtczak, A | M (SS) Global minimum learning outcomes that medical students must demonstrate at graduation ... with an increasing emphasis to be placed on professionalism, social sciences, health economics and the management of information and the healthcare system. |
| 2003 | Brazeau-Lamontagne, LB | EM (VB) Il s'agit de cette notion d'enseignement qui met l'accent non seulement sur le résultat (le médecin qui sait agir avec expertise, avec professionnalisme) mais aussi sur le processus même d'acquisition de ces compétences. [TRANSLATION] <i>A type of teaching that puts emphasis on not only the end result/outcome (the doctor who demonstrates mastery, demonstrates professionalism) but also on the process of achieving the competencies</i> |

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| 2003 | Burrows, S | M (SS) The identification of outcomes, the development of a curriculum to teach the identified outcomes, and the creation of assessment strategies to ensure that students master the specified outcomes by graduation, while asserting that all students can succeed, are the hallmarks of the outcomes-based curriculum model ... The curriculum is not only focused on ensuring that students master the outcomes, it is derived from the outcomes students need to demonstrate ... Curriculum decisions are driven by the outcomes students should possess. Learning outcomes are identified and communicated to all ... Assessment of student progress, which is key to curriculum reform, involves knowing, knowing how, showing how, and doing. "Knowing" is a test of knowledge"... "knowing how" is a clinical-based test ... "showing how" is a test of performance ... "doing" is a test of practice. |
| 2003 | Davies, IH | EM (SS) 1. Competency will provide a clear indication that [physicians] ... are trained to do their job properly. 2. By moving away from time-based training, a competency-based system recognizes that individual trainees develop their skills at different rates. |
| 2003 | Davis, MH | EM (SS) The goal is an outcome-based education approach that better prepares clinicians to meet both the needs of patients and the requirements of a changing health system ... A logical and essential aspect of this competence-based approach to education is the assessment of students' achievements of the necessary competences or outcomes. The learning outcomes must be clearly specified, but so also must be the methods of assessment whereby the students' achievements are judged. |
| 2003 | Lee, AG | EM (SS) Move away from the traditional curriculum that is based upon <i>learning what teachers choose to teach</i> to the new competency-based curriculum based upon <i>learning what they need to know to take care of patients</i> . The purpose of the process, specific learning objectives and goals, and a timeline have to be documented in an advanced blueprint ... The new curriculum will have to work within the existing time and scheduling constraints. The competencies should be integrated and "piggy-backed" on to existing structure ... curriculum design should take into account the clinical value and prioritization of content, a formal needs assessment, and the requirements of the learnings in order to maximize the learning within a fixed training period. |
| 2003 | Satava, RM | M (SS) Assessment of competence ... includes the following issues: 1) providing a precise, measurable definition of "surgical competence"; 2) defining the components of competence; 3) developing an appropriate taxonomy of the components; 4) agreeing on the metrics (preferably objective) for the components of competence; 5) developing tools to measure competence (e.g. multiple choice questions, objective structured clinical examinations and surgical simulation); 6) creating curricula that use these tools to train and evaluate residents and surgeons; and 7) deriving outcomes measures that can be standardized by the use of criteria. |
| 2003 | Smith, SR | M (VB) To graduate, a student must 1) demonstrate mastery of the medical knowledge base, 2) achieve beginning and intermediate levels of proficiency in nine key abilities, and 3) attain an advanced level in the ability called "problem-solving" and three other abilities that the student chooses based on his or her own interests. |
| 2004 | Bion, JF | EM (VB) Competency-based medical training is a powerful outcome-based strategy for defining the level of knowledge, skills and attitudes required of doctors at different stages of training. The methods by which those competencies are acquired and the time taken to do so may vary between trainees and between training programmes, but the competencies (defined in terms of knowledge, skills and attitudes) and the modes for assessing their acquisition are clearly defined and common to all. |
| 2004 | Brody, DS | M (SS) Competencies generally involve specific sets of knowledge, attitudes, techniques and skills that are used to accomplish tasks ... the curriculum has been designed to promote knowledge, demonstration, practice, observation and feedback, reflection and reinforcement in each of the selected competencies. |
| 2004 | Burr, WA | EM (VB) Competence will be confirmed by (often multiple) assessments and this system of competence-based curricula and assessment will be a radical departure from the traditional process-driven and time-determined training. Essentially, the competence-based system defines the desired outcome of training, which then drives the educational process. |
| 2004 | Carraccio, C | M (SS) Mesh discipline-specific curricula, the traditional goals and objectives, with the six competencies ... the process of shifting to a competency-based system is to further define the elements of the competencies by determining the measurable behavioral objectives that comprise the elements of the competency ... setting thresholds that demonstrate competence ... the establishment of consensus regarding the threshold for competence at each level of training for each specific benchmark. |
| 2004 | Carr, SJ | EM (VB) There is a need for professionals to demonstrate they are clinically competent to perform certain roles. |

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| 2004 | Long, DM | M (VB) In a competency-based program, every trainee proceeds to learn at whatever rate their capabilities allow. Some will acquire knowledge and skills faster than others. Escalating responsibilities depend upon demonstrated acquisition of skills and knowledge. |
| 2004 | Louie, AK | M (SS) Change to competency-based training will involve a broader cultural change ... moved medical education from apprenticeship-based to curriculum-based training ... The move to competency-based training may change this expectation in that the duration of training might be determined by the achievement of competencies as opposed to any other factor. |
| 2004 | Martin, JA | EM (VB) Curriculum development must incorporate multiple competencies into surgical training with appropriate assessments to determine when trainees have reached the desired level. Ultimately, a competency-based approach to training may well enable some surgical trainees to reach the required standard in less time than others. |
| 2004 | Minnesota Department of Health | G (VB) Competency-based education and training are a means by which the health care workforce can both acquire the knowledge, skills, and abilities required in a response and demonstrate the interaction of these elements in a given context, either in drills, exercises or training evaluations. Competency-based education focuses on the application of knowledge into observable outcomes or behaviors and is characterized by greater workplace relevance. |
| 2004 | O'Donnell, JF | M (SS) The competency-based model ... starts with defining the successful graduate, then designs measures and standards of performance, and only then develops the learning experiences. |
| 2004 | Redman, CWE | EM (SS) It was decided to use a competence-based approach, which would aim to deliver those competencies needed to practise colposcopy, rather than adopt the traditional knowledge-based approach ... [which] is theory-dominated and demands factual knowledge at the expense of practical experience and clinical competence. |
| 2004 | Rees, C | EM (VB) In outcomes-based education we try to reduce a complex adaptive system to its constituent parts by precisely defining the knowledge, skills and attitudes to be acquired by our students. |
| 2004 | Satava, RM | M (SS) The six [ACGME] competencies comprise ... a curriculum that is criterion driven, and thus the training of the student will not be based upon a fixed time, but rather based upon achieving a specific level of proficiency. |
| 2004 | Sectish, T | M (SS) To evaluate competence, one needs to directly observe and assess learners performing the tasks of real world future practice. This calls for "authentic assessment" ... Another important underpinning of the evaluation of competence is the use of criterion-referenced assessment as opposed to norm-referenced assessment ... competencies must be defined with appropriate benchmarks and performance standards set in terms of thresholds. |
| 2004 | Smith, LG | EM (SS) The educational process must be competency-based ... [and] demonstrate that a physician possesses the necessary knowledge, skills, and attitudes to practice medicine independently ... [Thus] practice-based learning leads to proven competency in patient care. |
| 2004 | Talbot, M | EM (SS) Apart from the practical problem of defining outcomes in models that are resolutely competency-based (often utilising terms such as "understands," "appreciates" and so on), such models have an unfortunate tendency to become pedagogic black holes in which alternative discourses of learning are engulfed. Such criterion-referenced approaches run the serious risk of negating a deep and reflective engagement with a professional practicum. In terms of assessment, the danger is always that we ask questions related to those things that may be more easily measured, instead of asking the more difficult questions ... Competency based upon a minimalist template denies the need of the learner to engage with the complicated practicum of medicine. This practicum is manifested by proficiency and is nearer to expertise than competence. |
| 2004 | Tufts Health Care Institute | G (VB) CBE requires identifying desired learning outcomes at five distinct stages of skill and knowledge acquisition through which learners progress: from novice to advanced beginner, to competent, proficient, and expert. |
| 2004 | University of Oklahoma | G (VB) In this approach, educational programs are first asked to be explicit about defining what constitutes competency. This is done through the development of explicit learning goals that are descriptive of what competency in a particular area of learning would look like. Stages toward full competency include novice, advanced beginner, proficiency, fully competent and expert. Outcome descriptions are provided for each stage. The learner is then expected to become an active part of assessing where they are relative to these outcome goals, provided with timely feedback from appropriate resources, and regularly assessed on key dimensions of competency achievement. This type of educative process helps the learner stay focused on a continual cycle of goal setting, self-assessment, and feedback needed for active and continual learning. |
| 2004 | Whitcomb, ME | M (SS) Simply identifying domains in which a physician must be "competent" (the so-called core competencies) is not sufficient ... So the core competency construct is useful in guiding the design of educational programs only if it leads first to the development of specific learning objectives for each core competency – that is, the knowledge, skills, and attitudes the learners enrolled in the programs are expected to achieve. |

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|------|------------------|---|
| 2005 | ACGME | R (SS) 1) Incorporation of a set of general competencies to organize curricula; 2) Support for programs through identification and development of useful, reliable, and valid methods for assessing attainment of the competencies; 3) Development of model resident evaluation systems to provide examples of dependable evaluation; 4) Support of a resource support system. |
| 2005 | Bannister, M | EM (SS) The starting point in developing a competent practitioner is the development of the knowledge base necessary to support their clinical practice ... The development of a practitioner's knowledge bases will not guarantee achievement of the required competency, and integration of knowledge into practice is essential ... utilization of portfolios as a means of assessing clinical competence appears the most appropriate ... A competent diabetes practitioner has the clinical skills necessary to work in partnership with the patients to ensure their care needs are fulfilled ... utilization of competency frameworks in both education delivery and assessment will facilitate linkage of theory to practice. |
| 2005 | Baum, KD | M (SS) Competency-based education ... implies a training process that results in proven competency in certain skills and behaviors required to practice that profession. Each trainee would have to demonstrate the acquisition and application the required knowledge, skills and behavior in order to complete training (or move to the next step in the curriculum). |
| 2005 | Clements, R | EM (SS) [Describes] the range of work activities needed to deliver a service ... Achievement of competence requires demonstration of a defined range of underpinning knowledge, psychomotor skills and behavioural attitudes ... associated with high quality and safe care. |
| 2005 | Crebbin, W | M (SS) Definition of specific, discrete, observable skills, defined in terms of behaviour ... very precise statements of performance requirements, often in the form of checklists ... complex combinations of personal attributes (knowledge, capabilities, attitudes, and skills), formed into coherent structures which enable the performance of a variety of tasks. |
| 2005 | Doshi, M | EM (SS) Training is becoming more outcome-based, with a move away from the apprenticeship model to a more structured and systematic approach emphasising the learning and development of skills (including skills for CPD). This involves a shift from time-based training to a trainee-centred, competency-based model ... The new competency-based learning emphasises outcome in the form of performance. |
| 2005 | Goldstein, EA | M (VB) Competency domains and benchmarks define skill areas in which deepening, progressive attention is focused throughout medical school. This education model places primary focus on the student. |
| 2005 | Hance, J | M (VB) By definition, a competency-based curriculum requires valid assessments at regular intervals to examine the surgical trainees' acquisition of the traits necessary to become a surgeon such as knowledge, technical proficiency and professional attitudes. |
| 2005 | Korndorffer, JR | M (VB) The major advantage of using goal-oriented training is uniformity of the final product; all trainees should reach competency. Moreover, subjects can learn at their own speed. This method may efficiently train those with higher innate ability and avoid unnecessary repetition while ensuring adequate training of those with slower skill development or less innate ability. The ultimate improvement may also be better than the improvement after training using arbitrary duration end points. |
| 2005 | Newble, D | M (SS) Outcome-focused approach: defining what the graduating doctor must know, be able to perform and the appropriate attitudes and behaviours ... organising the content of the core curriculum under only 2 vertical themes, clinical competence and underpinning medical sciences ... The outcome-based approach has provided a rationale for identifying the content of the core curriculum by focusing on what it is that the student needs to know or be able to do in relation to the clinical problems with which they will have to deal as a PRHO. |
| 2005 | Perkins, GD | M (SS) The advantage of a competency based curriculum is that is ... promotes standardisation of the end product whilst at the same time encouraging locally appropriate approaches to content delivery and the integration of training throughout the curriculum rather than confining it to the final undergraduate year or postgraduate training. |
| 2005 | Reich, LM | M (VB) The focus of competency-based education is on outcomes, specifically well-trained residents. Our goal is to help move resident assessment away from content- and process-based factors and towards measures of mastery of practice. |
| 2005 | Sanson-Fisher, R | M (SS) A goal of competency-based teaching and assessment is that all students ... achieve and demonstrate pre-defined performance standards. ... developing a list of clinical conditions around which students' diagnostic and management skills are based would achieve [competence].... Competence refers to the knowledge, skills, and attitudes a student should exhibit by the time of graduation in order to cope successfully with the clinical environment that they encounter as an intern. |

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| 2006 | ACGME | G (VB) Competency-based education focuses on learner performance, often called learning outcomes, in reaching specific objectives, which are often called goals and objectives. It shifts our focus away from process-oriented measures of education (i.e., how many procedures a resident completed) to outcome-oriented measures (how well the resident completed the procedure). In addition, competency-based education is built upon having a curriculum plan in place, identified goals, and objectives of the learning experience, using various types of teaching strategies, as well as using various method(s) for assessing whether the resident has achieved the objectives. |
| 2006 | AITEC | G (VB) Education or training in which learning is based on specified outcomes which require competency to be demonstrated and assessed. |
| 2006 | Binenbaum, G | EM (SS) In a competency-based education model ... competency standards are set and residents are compared with those standards, not to each other. Therefore, ultimately resident graduates are not categorized as above average or below average, only as surgically competent, although some residents take longer to acquire their skills. |
| 2006 | Brown, AK | M (VB) A competency based approach to the education of rheumatologists in musculoskeletal ultrasonography (MSK US) ensures standards are documented, transparent, accountable and defensible, with clear benefit to all stakeholders. |
| 2006 | CoBatRICE | M (VB) Competency-based training: A strategy which aims to standardise the outcome of training (what sort of specialist will be produced) rather than the educational processes (how the specialist is produced). Competency-based training programme: A programme which defines the outcomes (competencies) required of physicians at different stages of training, provides guidelines for the assessment of these outcomes and educational resources to support their acquisition within the workplace. |
| 2006 | Edgren, G | EM (SS) The competence-based approach focuses on outcomes as opposed to the more traditional approaches that focus on input ... competence movement is oriented more towards outcomes that are specifically relevant to employment ... Competence-based curricula need to be based on knowledge of the competence needed for professional activities. |
| 2006 | Glasgow, N | G (VB) Competency-based education (CBE) programs focus on outcomes, rather than acquisition of knowledge. They contrast with structure and process-based educational programs in emphasising student and teacher responsibility for program content, ideally take place in actual work contexts, are criterion referenced, stress formative assessment and can be completed in variable time frames. An outcomes focus is a common goal in many health-related domains, including education. It can enhance transparency, efficiency, effectiveness, quality, public accountability and this is part of the reason for the appeal of outcomes-oriented educational approaches. |
| 2006 | Harden, RM | M (SS) Focus on the product and the expected learning outcomes ... learning outcomes for postgraduate training are clearly identified, made explicit, and communicated to those concerned, including all stakeholders. These educational outcomes should be the overriding factor in decisions concerning the postgraduate curriculum and training programme. |
| 2006 | Harrison, R | M (SS) An outcomes-based approach to occupational competence shifts the emphasis from what abilities the individual should possess to how he or she is expected to perform in the workplace ... An outcomes-based approach turns the curriculum concept on its head. The initial and essential step is a clear concept of occupational competence, expressed as occupational standards, from which are derived the curriculum – what the individual needs to learn to achieve the standard – and the assessment system – how the individual will demonstrate that she/he has achieved the standard. |
| 2006 | Leong, SCL | EM (VB) Instead of the current “time-based” system of training, the new curriculum will be based on the acquisition of agreed competencies |
| 2006 | McKean, SC | M (SS) Specific competencies describe unambiguous, measurable learning objectives ... divides competencies into three domains of educational outcomes: cognitive (knowledge), affective (attitudes), and psychomotor (skills). Each domain has defined levels of proficiency going from knowledge, the lowest level, to evaluation, the highest. |
| 2006 | Rose, N | EM (SS) The most significant change is the long overdue shift to defining doctors in terms of their competencies or skills. These will now become the outcome measure of training, supported by relevant curricula and assessment programmes ... the actual performance of doctors now lies at the heart of the new training arrangements. |

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| 2006 | Verma, S | M (SS) The competencies... values, knowledge, attitudes, and skills... identified as essential ... behavior or set of behaviors that describe excellent performance in a particular work context ... In health care, competencies are used to define discipline and specialty standards and expectations and to align practitioners, learners, teachers, and patients with evidence-based standards of health care and performance. Competencies in education create an environment that fosters empowerment, accountability, and performance evaluation which is consistent and equitable. The acquisition of competencies can be through talent, experience, or training. A competency model is a set of success factors that include the key attributes required for excellent performance in a particular role ... Competency models increase the effectiveness of training and educational programs by linking them to defined criteria. |
| 2007 | Aggarwal, R | M (SS) There is a shift in the philosophy of medical education not only to incorporate lifestyles but to deliver a competency-based system of achievement and progression. It is not time spent on the ward ... that is important, but the attainment of predetermined goals ... The aim is to develop specific and focused learning objectives, with built-in demonstration of clinical competence before progression ... Each trainee completes a number of assessments, leading to the development of a portfolio of clinical performance ... failure to achieve performance goals results in a period of retraining and subsequent revalidation of skills ... fosters the development of incentives for lifelong learning and career growth. |
| 2007 | American College of Osteopathic Surgeons | G (SS) What does it actually mean to become competency-based? From the traditional educational unit that was time-based and instructor-centered, the unit of progression becomes a demonstration of specific knowledge and skills and is learner-centered ... Basically, the competency-based approach in residency education asks the question: What do surgeons need to know and be able to do upon completion of this residency? |
| 2007 | Bennett, C | EM (VB) Competence frameworks describe the activities that cover a patient pathway, practitioner role or specialty area. Individual competences within a framework describe the activities – in this case relating to genetics – and indicate how they are carried out, with underpinning knowledge, understanding and attitudes. |
| 2007 | Bhatti, NI | EM (VB) Ensuring that the graduating surgeons are competent to deliver the necessary services and skills to their patients remains a seminal objective of training programs. Defining surgical competence, the measures used to assess and quantify that competence, and the criteria used to judge whether it has been achieved are critical issues. |
| 2007 | Christensen, L | SRL (SS) Outcome standards or learning outcome standards specify what graduates should be capable of doing by completion of their training as measured in assessment of students ... Outcome-based education relies on assessment of the competencies of the graduates, who must show that the required competencies are obtained ... Outcome-based learning has the advantage of facilitating the interrelationship between knowledge, skills, and attitudes into a competence, which is measurable. |
| 2007 | Collins, JP | M (SS) The new programme is competency-based and shorter than any designed previously. Implicitly it recognizes in the curriculum and assessment development and processes, the nine roles and their underpinning competencies identified as essential for a surgeon ... It has been agreed that the programme will be competency based in contradistinction to time based. |
| 2007 | Davis, MH | M (SS) Outcome-based education is one of the most significant global developments in medical education in recent years ... OBE is an approach to education in which decisions about the curriculum are driven by the learning outcomes students should display at the end of the course. These decisions include curriculum content, educational strategies, student selection and assessment. |
| 2007 | Dingle, AD | M (SS) The competency movement promotes a model in which a defined outcome drives the educational process, unlike the present system, which is generally structure and process oriented ... an educational and assessment system that can define the fundamental characteristics of a competent physician, describe what experiences are necessary to develop those attributes and abilities, and reliably evaluate whether a specific physician has and can use effectively the desired knowledge and skills. |
| 2007 | Edwards, FD | M (SS) The creation of a competency-based educational system requires the thoughtful assembly of several key components and a plan to guide its successful implementation. Key components include both instructional and assessment pieces, as well as the energy and buy-in of dedicated faculty members. Specific learning objectives, valid assessment tools, and a safe learning environment where the learner feels comfortable disclosing self-identified deficiencies are essential ... competency-based educational systems focused on educational outcomes are required to ensure that graduates are equipped to provide the safest, most appropriate, and most compassionate care possible. |

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| 2007 | Gallagher, F | M (SS) Peer-based, legal, client and educational drivers ... are to be recommended as a basis from which competencies, learning outcomes and hence a suitable syllabus for postgraduate training could be derived. |
| 2007a | Harden, RM | EM (SS) Outcome-based education (OBE) requires, in addition to the specification of learning outcomes, a close match between the outcomes and the curriculum content, the teaching methods and learning strategies, the assessment and the educational environment ... In OBE, students are required to achieve the required minimum level of competence in all of the domains and the question of compensation across different domains is therefore not relevant ... greater responsibility is given to the student to demonstrate that they have achieved the necessary outcomes. |
| 2007b | Harden, RM | EM (VB) In OBE it is specified what students are expected to learn and the course of study is arranged so that they achieve this. |
| 2007 | Heffron, M | EM (SS) Assessment of a physician's competence against an identified set of criteria requires medical educators to link performance with reliable and valid measures ... competency-based education seeks to provide competency-specific learning opportunities and feedback for residents and practicing physicians matched to their stage of expertise. |
| 2007 | Jackson, MJ | M (SS) The curricula should be based on competencies that enable a physician to perform effectively in his or her practice setting and meet the standards of the profession. The competencies should reflect the scope of practice ... Core competencies are those that must be maintained or acquired by all who are certified to practice in a specialty area ... A competency-based curriculum framework creates a foundation for CME in all practice settings delivered by all types of provider organizations. |
| 2007 | Litzelman, DK | M (VB) A competency-based curriculum that requires students to demonstrate proficiency in nine core competencies and to create simultaneously an informant curriculum that models and supports the moral, professional and human values expressed in the formal curriculum. |
| 2007 | Meyers, FJ | G (SS) The acquisition of competence is progressive throughout training and during a lifetime of practice ... education should ensure that residents achieve the proficient stage on the completion of training ... true competency-based education would allow residents to graduate after they had become competent in all domains. |
| 2007 | Whitcomb, ME | M (VB) Documenting that a graduating resident has mastered, at some predetermined level the knowledge, skills and attitudes associated with each of the core competencies, while informative, does not ensure that the individual is a competent physician. Something more is needed: graduating residents must be able to translate and integrate their knowledge, skills and attitudes so they can perform the complex tasks required to deliver high quality medical care. |
| 2008a | Albanese, MA | G (VB) A competency-based curriculum starts with the qualities of the competent graduate and then slices and dices them into digestible parts and distributes them in a developmentally appropriate manner across the curriculum. Course goals and objectives are modified by the presence of the competencies because students must demonstrate that they have achieved each competency before they are allowed to progress in the curriculum. |
| 2008b | Albanese, MA | EM (SS) Competency-based and outcome-based medical education focus on the result of the educational process, not the process itself ... Competencies are "knowledge, skills, attitudes, and personal qualities essential to the practice of medicine" ...A competency model starts with a focus on patient care outcomes and takes the additional step of determining which outcomes doctors <i>need</i> to have ... outcomes are more broadly defined as being <i>desirable</i> of the practising doctor. |
| 2008 | Bahnon, RR | EM (VB) As we establish the curriculum priorities for acquisition of these competences (ACGME), we must define those core skills that are enduring and are required of every resident. In addition, it is important to identify those skills that are important to know and periodically do and, finally, consider those skills and knowledge that are worth being familiar with. The final stage in curriculum design is the planning of learning experiences and instructions. |
| 2008 | Bancroft, GN | M (SS) An outcomes-based residency education consists of defining what needs to be taught and then evaluating through outcome assessment tools how well the material has been learned ... An outcomes-based residency curriculum focused on core competencies consists of two components: (1) teaching the core competency material and (2) evaluating how well the residents have learned it. |
| 2008 | Bandiera, G | G (SS) Competency-based medical education models require learners to demonstrate progression toward achieving multiple goals. |

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| 2008 | Blake, G | M (VB) The competency in most areas will not require a specific number of procedures to be performed, a predetermined number of patient encounters, or specific length of time in the program. Mastery will be shown to have been obtained when the resident demonstrates competency according to evidence-based principles utilizing evaluation techniques appropriate to the component being tested; for example – clinical demonstration, cognitive testing, oral discussion and/or medical simulation. |
| 2008 | Boucher, A | G (VB) Competency-based curriculum features: 1. Student-centered, emphasis on autonomy (responsibility) and reflexive approach 2. Learning contexts close to realities of practice 3. Integrated program in a learning continuum - use of acquired knowledge |
| 2008 | Brydges, R | M (VB) Implementation of proficiency-based training programs requires initial development of a standard definition of proficiency criteria, standardization of the methods used to establish these criteria, and standardization of the contexts in and simulators with which skills are taught and evaluated. |
| 2008 | Collins, JP | EM (SS) Although the educational basis for competence-based training programs is attractive, its implementation has raised a number of challenges. This method focuses on the attainment of a number of predetermined areas of competence and not on time spent on the wards, in consultative clinics, in the operating room, or with a tutor ... Furthermore, the philosophy of allowing individual trainees to take as long as required to achieve competence is at odds with simultaneous efforts to shorten training ... Adequate resources, a comprehensive training system for trainers, and cooperation and commitment by teachers, trainees, and employers are essential for successful implementation of this educational philosophy. |
| 2008 | Duffy, FD | M (SS) Competence cannot be determined by an arbitrary number of months of training; however, it seems unreasonable that competence could be achieved in fewer than 24 months of foundational training, and many residents may require 36 months or more ... So, asking “what is the best duration of training for internal medicine” misses the point that training for professional practice should be a seamless process from basic education, professional practice formation, and subspecialization or developing expertise in focused areas of practice. The concept of competency-based education and certification frees us from the mental prison of time-based formal training and lifelong one-time certification. |
| 2008 | Kuvin, JT | M (SS) This approach ensures that fellows are exposed to a broad-based curriculum and are evaluated to assess competence not only in knowledge but in all areas considered important for the practice of medicine ... Competency-based training is especially important in cardio-vascular education, given the necessity of mastering a variety of technical skills and procedures, in addition to other clinical skills, before graduation. The competencies compel programs to provide a wide variety of experiences for trainees, incorporating training far beyond the technical details of how to perform certain procedures ... Thus, competency-based training in the cardiac catheterization requires, in addition to mastering the technical skills, training and evaluation that are centered around professionalism toward patients, families, and coworkers; compassionate practice; effective communication; practice improvement initiatives; and understanding the physician's role in the larger healthcare environment. |
| 2008 | Lees, V | EM (SS) The competency model for medical training brings with it a definite risk that future surgeons will find their practice restricted to the specific procedures for which they have received formal certification ... The competency-based model is unlikely to equip the young consultant with sufficient number of procedures to function from the outset as newly appointed consultants have done in the past ... One solution to the problem of the current competency-based training approach, outlined earlier, would be to introduce training by “elemental competencies.” More complex operations could be taught in terms of their component parts, or elements. The young surgeon would then be able to undertake similar, but not identical, operations in the future by assembling various elements with which he/she was judged to be competent. |
| 2008 | Sherbino, J | M (VB) Competency-based education is predicted on the principles of achievable objectives and definable standards of performance, both of which must be readily accessible to teachers, learners and assessors. |
| 2008 | Shumway, J | G (VB) Characteristics of Competency-Based Education: 1. Where the learning outcomes (competencies) are identified, performance based, and communicated to all. 2. Provides a compelling statement of significant exit outcomes to the public, families, colleagues, and all providers. 3. May be adapted to suit local context and needs. 4. Emphasizes the personal development of the health care provider as a professional. 5. Where the accomplishment of competence is able to be assessed. 6. Where a criterion-referenced system of student assessment is the norm. 7. Is applicable to all phases of the continuum of professional education. |

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| 2008 | Thomas, WEG | EM (VB) One of the major challenges in surgical training today is as to what constitutes competency and how is competency progression reliably assessed. Competency is very situation specific and time related, and is therefore a moving target. Competences need to be defined within a curriculum for each surgical specialty and for each stage in a training programme. This requires each surgical specialty to identify these competences, and then to declare explicitly what a trainee should know, be able to do and the conditions that they should be able to manage for each stage of their training. |
| 2008 | van Zuilen, M | M (VB) This curriculum transformation shifted the focus from what is taught to what is <i>learned</i> and provided documentation of each graduating medical student's competency in core areas of geriatrics. |
| 2009 | Boateng, B | G (SS) Benchmarks ... addressing the following questions: 1. Which elements (knowledge, skill, and attitude) make up a particular competency, as it applies to pediatrics? 2. What are the recognizable behavioral anchors? Are these behaviors observable? 3. What are the benchmarks? 4. How will the behavioural anchors be measured? ... defined outcomes as the expression of the learner's capability as demonstrated through particular skills and behaviours. |
| 2009 | Bould, M | M (VB) factors have led to a paradigm shift in postgraduate medical education from systems based on completing accredited posts for a specified amount of time to "competency-based" curricula which demand a focused and rigorous method of evaluating procedural skills. |
| 2009 | Brownson, R | EM (VB) Formally, a competency is defined as a cluster of related knowledge, attitudes, and skills that affects the major part of one's job and can be measured against well-accepted standards and improved through training. Competency sets are used both to guide curriculum development and credentialing processes. |
| 2009 | Cain, R | G (VB) Checkpoints: – Tell the learner what they need to know – Tell them when they need to know it – Tell the assessor what they need to do – Tell the learner how they are progressing – Tell them if they need to focus on any areas to reach mastery |
| 2009 | Curran, V | EM (SS) Competency-based curriculum ... a way to define the knowledge, skill and attitudinal outcomes expected of the pre-licensure learner. |
| 2009 | Demczuk, L | M (VB) Competency-based education is a paradigm shift from the teacher-centered, passive delivery of training and education toward an active, learner-centered education reflective of adult learning theory. The desired outcome of training drives the educational process and, in turn, focuses on performance-based assessment of skills, knowledge, and understanding. The learner-centered environment of competency-based education incorporates problem-based learning and critical thinking, both of which require the competencies of [information literacy] IL. |
| 2009 | Eardley, I | EM (VB) Curricula that allow different trainees to travel at different speeds such that when they are able to demonstrate their competence in an area, they are deemed "trained." |
| 2009 | Gould, DA | EM (VB) Input will be required from psychologists and experts in the subject matter, who will analyze knowledge and task performance, breaking them down into their key components. Metrics must be identified and used specifically for assessment of the learner. |
| 2009 | Government of Victoria | G (SS) Learning outcomes must be demonstrated to be consistent with relevant profession-based competency standards ... Competence is a generic term referring to a person's overall ability while competency refers to specific capabilities, such as leadership, and is made up of knowledge, skills and attitudes ... [competency] ... links general attributes to the context in which they will be used and therefore avoids the problem of long task lists by selecting key tasks or elements that are central to the practice of a given occupation. |
| 2009 | Henson, LC | G (VB) Competency-based education is an approach to curriculum and assessment that places primary emphasis on identifying and measuring specific learning outcomes. |
| 2009 | Kilroy, DA | EM (VB) On the face of it, employing a "competency-based" approach to medicine delivers a straightforward public outcome: all doctors who "pass-through" the training will be sufficiently able to perform a wide but necessarily basic range of tasks appropriate to their field. |

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| 2009 | Leipzig, RM | G (VB) Competency-based education prepares trainees to perform tasks occurring within the context of practice. Teaching to competency differs from traditional instruction. It begins by stating the performance we expect of our graduates in the workplace and then designing the medical school curriculum to prepare our learners to achieve that performance through deliberate practice in applying the underlying knowledge, skills, and attitudes. |
| 2009 | Levinson, W | G (SS) The primary focus of [competency-based education and training] CBET is the learner's attainment of mastery of knowledge, skills, and attitudes in specific competencies ... CBET requires a learner to be the primary driver of his or her own education, necessitates more robust assessment and feedback, and focuses on knowledge application rather than just acquisition. The one distinguishing feature of CBET causing the most consternation is that residents could progress through the educational process at different rates ... CBET is about all learners, not just the most talented who can move through training more quickly. |
| 2009 | Marshfield Clinic Education Foundation | G (VB) Competency-Based Education (CBE) is an approach to instruction and assessment that places primary emphasis on identifying and measuring specific learning outcomes, or competencies. Unlike general goals, competencies are written as real-life abilities that are required for effective professional practice. |
| 2009 | RACGP | G (SS) Competency-based education provides the individual in training with a series of competency barriers at which they must demonstrate attainment of mastery of that area of learning. This form of training is not time limited and allows individuals to progress through training at a rate determined by their mastery of required core competencies ... Competency-based training is training focused on specific training outcomes. It is based on a full curriculum which takes into account attainment of competencies in all aspects of the training program, including clinical placements ... The benefit of a competency framework does not lie in a reduction of training time, or in reduced training costs, but instead lies in the early identification of registrars who may experience difficulty in progressing, and to whom remediation can be applied. |
| 2009 | Smith, AJ | G (VB) Focus is on learner performance (learning outcomes) in reaching specific objectives (goals and objectives of the curriculum). ACGME emphasis is on educational OUTCOMES (vs. process) in the accreditation of residency programs. |
| 2009 | Talbert, ML | G (VB) Competency-based education involves specific learning objectives around which a curriculum is designed and against which each trainee's progress is assessed. |
| 2009 | Talbot, M | ER (VB) The imperative is to have achieved (and to document the achievement of) the serial completion of stages broken down from the sub-units of a task. |
| 2009 | Tsuda, S | EM (SS) Proficiency-based training refers to the use of performance-based endpoints during simulation curricula. Until recently, skills training protocols routinely used arbitrary parameters, such as a total amount of time, or several repetitions, to determine how much practice should be afforded. Although a prerequisite duration, such as 5 hours of practice for a given skill set, may accomplish the basic goal of fostering practice, a time-based training endpoint does not relate in any fashion to the level of performance that is achieved ... Moreover, a one-size-fits-all approach does not utilize the lessons we have learned from the psychology literature, including deliberate practice concepts of goal-oriented learning, and ignores the need for different amounts of practice for different individuals. |
| 2009 | Whipple, EC | M (VB) A competency-based curriculum, with students having to achieve certain levels within each of the nine competencies to successfully matriculate. |
| Unknown | BMA | G (SS) The competency-based approach to medical education is ... an analysis of occupational roles, the translation of these roles (in other words competencies) into outcomes, and then the assessment of a doctor's progress in meeting these outcomes. The main focus of assessment is on whether or not the doctor has met the clearly-defined outcomes. |
| Unknown | Indiana University School of Medicine | SRL (SS) We actually have partly defined our graduates – we expect them to master a certain body of knowledge ... But each of us must have additional expectations of our graduates besides “knowing” a certain body of information. We must also expect them to be able “to do” certain things ... that is, what competencies we expect them to demonstrate in order to graduate. |
| Unknown | Jensen, B | G (SS) Probably the best example of competency-based learning takes place in medical residency programs where medical doctors expand their competencies into specialties ... The learning is active rather than passive. The learning is integrative and reinforcing since dealing with patients reinforces prior learning in medical school. And competency is based upon expert assessment of skills apart from written examinations. Feedback from mentors, peers, nurses, technicians, and even patients themselves plays a far greater role in assessing competence than certification examinations. The incompetent are weeded out before becoming eligible to even take the certification examinations. |

| Year | Author | Source and definition (M = MEDLINE, EM = EMBASE, ER = ERIC, G = Google, R = Reviewer nominated, SRL = Reference list) |
|---|---------------------------|--|
| Unknown | Nawotniak, R | G (SS) -The goal is knowledge application <ul style="list-style-type: none"> - The teacher and resident are responsible for content - The typical evaluation is formative, involving multiple designs ... - Evaluation is criterion referenced - how is the resident doing in relation to the standards that are individually set - The ACGME wants to know if programs are training residents to be competent physicians |
| Unknown | Online Medical Dictionary | G (VB) Educational programs designed to ensure that students attain prespecified levels of competence in a given field or training activity. Emphasis is on achievement or specified objectives. |
| Unknown | Smith, SR | SRL (SS) The rationale animating the competency-based curriculum stems from the need to define the outcomes of the educational process: what are the desirable qualities of a medical school graduate, and what constitutes the essential knowledge base that will enable a graduate to make a successful transition to his/her medical field? ... each of the abilities includes a list of specific criteria that the student is expected to master at a certain level of achievement. |
| Unknown | Taylor, C | R (SS) Competency-Based Education (CBE) is an approach to instruction and assessment that places primary emphasis on identifying and measuring specific learning outcomes, or competencies. Unlike general goals, competencies are written as real-life abilities that are required for effective professional practice ... In CBE, teaching and learning are: 1. explicit and clearly aligned with expected competencies; 2. criteria-driven, focusing on accountability in reaching benchmarks and, ultimately, competence; 3. grounded in "real life" experiences; 4. focused on fostering the learners' ability to self-assess; 5. individualized, providing more opportunities for independent study ... will be asked to meet performance-based, competency standards ... measured against clear criteria rather than against one another ... knowledge and skills and attitudes synthesized into effective performance. |
| Unknown | University of Minnesota | G (SS) Students [are] expected to demonstrate the competencies and the ability to integrate across competencies to graduate. Student achievement of competencies, related concepts, and learning objectives will be assessed not only in specific medical school courses but also by institutional competency assessments called "Milestones." |
| *VB = the definition shown was taken verbatim from the source referenced. †SS = the definition shown was pieced together from parts within the referenced source; | | |