

Competency-Based Residency Education

I. Introduction/Background

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 1999, as one of the steps in its Outcome Project, the ACGME approved six **General Competency domains**. The competencies represent areas of skill and knowledge that residents are expected to demonstrate before graduation. The ACGME identified these six competencies after extensive research and collaboration with a wide array of knowledgeable and interested constituents. The major purposes and components of the ACGME Outcome Project and the six General Competencies are compatible with CBE.

The purpose of this current project is to provide residency directors and faculty with suggestions and examples of teaching methods that are 1) consistent with the characteristics of competency-based education, and 2) useful for providing learning opportunities in the six competencies.

II. Common Characteristics of CBE

After reviewing four decades of literature on competency-based education, five characteristics stand out as being particularly descriptive of teaching from the perspective of competency-based education. 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.

For many residency programs, the change to teaching from a CBE perspective will require very little adjustment; for others, the change may seem more substantial. Teaching venues will remain the same. Residents will still attend lectures and learn at the bedside, in both the outpatient clinic and operating room; they will continue, as well, to participate in small group clinical conferences and morning report. Some programs, however, may have to identify and communicate sooner the exact learning objectives and the criteria by which they will be assessed, as well as the degree to which additional guided or independent study may be necessary.

Further descriptions of these five characteristics follow.

1. Teaching/Learning Is Explicit and Clearly Aligned With Expected Competencies

The “residency experience” is rich in opportunities to learn. Rotations, however, are often hectic, and learning opportunities may be missed because of timing, confusion about learning priorities, and limited contact with patients. Often, especially early in residency training, a rotation is completed before residents recognize where to focus their attention. The same may be true for the didactic curriculum, where general topics and the “disease of the week” are presented to residents, without the outcomes or expected competencies being clearly identified.

- ⌚ In CBE, teaching and learning are purposeful. They are made so by explicitly stated learning goals, defined in advance and linked with competencies. Faculty, therefore, must consider the six general competencies when planning instructional activities, and must provide clear learning objectives that link the experience with the competency.

⌚ Explicit learning objectives linked to competencies and identified in advance of an instructional event provide focus and direction, and make clear the full breadth of expected performance for purposes of teaching and learning. For example, a competency such as communication skills, that may have been overshadowed in the past in the quest for medical knowledge, can be highlighted and integrated into clinical and didactic teaching.

⌚ In support of CBE, research shows that students learn better when goals, instruction, and outcomes are aligned. Studies in higher education have found that providing learners with early guidance and continuing comment leads to increased learning, higher skill levels, and higher self-esteem.

2. Teaching/Learning Is Criteria Driven and Focused On Accountability

With the advent of the ACGME competencies, it is likely that residents as well as practicing physicians will be asked to meet performance-based, competency standards when applying for licensure and re-licensure. Because the accreditation process is now more focused on setting, achieving, and maintaining standards, instruction should be designed in careful alignment with the identified outcomes or competencies. Explicit rather than general instruction should predominate, helping learners to place new information into a form that is useful in practice.

⌚ Although “accountability” is gauged primarily through assessment tools, instruction that provides benchmarks and promotes feedback, self-assessment, consideration of clinical evidence, and the prudent use of practice guidelines leads to an “accountability mindset” in the program and its faculty and residents.

⌚ In a competency-based educational system, residents are measured against clear criteria rather than against one another. This practice reduces subjectivity and competitive pressure. Thus it is easier for residents to work cooperatively and become resources for one another as they strive to meet standards.

⌚ Determining performance criteria will be a challenge since evidence-based gold standards for resident performance in the competency areas generally are not available. Faculty, therefore, will need to use their best judgment, the consensus of their peers, and criteria-like resources that are available, such as evidence-based clinical guidelines.

3. Teaching and Learning Grounded in Real-Life Experiences

From the earliest conception of competency-based education in the 1960's, competencies have been framed as the active performance of real-life roles consistent with effective practice. Competencies are composed of more than knowledge and skills; they are knowledge and skills and attitudes synthesized into effective performance. The ACGME competency domains are all essential to the practice of medicine, with their sub-goals framed in performance (click here to review general competencies).

- ⌚ Much of residency education occurs as residents are performing patient care activities in the same settings where professional practice will occur. Thus residency education exemplifies this aspect of CBE.
- ⌚ Learning opportunities provided through lectures, conferences, and independent reading are not as close to "real-life" as the experiential learning that takes place in the clinical setting. Nonetheless, they are consistent with CBE when they focus on the actual problems of patients and their families, as well as on the problems inherent in the delivery of efficient, effective, compassionate health care. These learning opportunities should be based in real or simulated clinical problems, and should be guided by experienced faculty using reflections, questions, assignments, and feedback.

4. Teaching and Learning Strategies are Focused on Fostering the Learners' Ability To Self-Assess

It is essential that residents become good judges of their own competence. It is generally accepted that individuals learn to judge their own performance in a number of ways, but most often by comparing their own abilities to some external standard and then internalizing that standard. A standard may be written objectives (as in the competencies) or, more powerfully, may be the skilled performance of influential and credible role models.

- ⌚ By developing learning and performance standards from the competencies, and by communicating those standards to residents, faculty provide a more objective basis for resident self-assessment.
- ⌚ When residents observe the skilled practice of experienced clinicians, they may or may not understand the thought process that guided that action. When experienced clinicians reflect on their decision making, however, residents are more likely to truly understand the actions of their teachers, to model that behavior, and to eventually establish appropriate standards. Without these types of discussions, residents remain uncertain about their observations and gain less from the interactions.
- ⌚ By providing feedback to residents and encouraging them to reflect on their own clinical behavior, residents will become better judges of their own abilities. Although the attending physician is the usual source for feedback, nurses, peers and patients through a 360 evaluation can provide other insights into residents' performance and so potentially affect the internal standards set.

5. Teaching And Learning Is More Individualized, Providing Opportunities For Independent Study

Throughout its history, competency-based education has been sensitive to the differing backgrounds, learning styles, aptitudes, and abilities of learners. As experienced educators, we know that interns enter residency with different knowledge and skills, and that residents enter new rotations or educational experiences with differing abilities, motivation, and knowledge bases. If all residents are expected to reach competency, it stands to reason that we will have to provide additional resources to those who start out at a disadvantage or who learn best through individual study and practice.

⌚ Individualized study in the form, for example, of portfolio entries, computer-based learning modules, virtual conferences, and interactions with standardized patients provide residents with the options for self-paced study and learning.

⌚ Individualized study can be offered as complementary to other group learning activities or as “stand alone” learning modules. For example, the PowerPoint slides from a lecture could be provided at the residency website for later review, or the presentation, with pre-tests and post-tests could be placed on the website in place of a lecture.

⌚ Although computer-based learning modules provide an efficient means for transmitting certain types of information, and “virtual clinics” do a good job of simulating patient interaction, nothing can replace the advice of a mentor or the real-life interaction with a patient. Electronic media should be integrated with a strong interpersonal approach to learning.

e. If not electronic or web-based, when are they distributed to faculty?

f. If electronic or web-based, do you send out reminders to access them?

g. If yes, when do you send reminders?

h. Have the competencies been incorporated into the goals and objectives?

PRACTICE-BASED LEARNING AND IMPROVEMENT

Residents must be able to investigate and evaluate their patient care practices, appraise and assimilate scientific evidence, and improve their patient care practices. Residents are expected to:

- analyze practice experience and perform practice-based improvement activities using a systematic methodology
- locate, appraise, and assimilate evidence from scientific studies related to their patients' health problems
- obtain and use information about their own population of patients and the larger population from which their patients are drawn
- apply knowledge of study designs and statistical methods to the appraisal of clinical studies and other information on diagnostic and therapeutic effectiveness
- use information technology to manage information, access on-line medical information; and support their own education
- facilitate the learning of students and other health care professionals

Self-Assessment and Life-Long Learning

1. By whom are residents mentored?

2. How are these mentors selected?

3. Outline the faculty development activities that are provided for acquainting the faculty with mentoring skills.

4. What is the process for mentoring the residents?

5. What guidelines are provided for topics to be addressed during meetings between mentors and mentees?

6. Identify specific ways in which the program fosters self-reflection, self-assessment and practice improvement for residents.

7. Is it required that each resident have an individualized learning plan?

8. Who provides guidance to the resident in completing this plan?

9. How often are these plans developed or updated?

Quality Improvement

10. List the activities in which residents actively participate to learn and apply the principles of quality improvement, and identify those who oversee these activities.

11. Give an example of a quality improvement activity/project that residents have been involved with during the past year or are currently. Describe its development, goal, implementation, evaluation of success.

12. How does the program ensure that residents provide and document continuity of care?

Teaching Skills

13. Describe how residents learn teaching skills.

14. What opportunities are available for resident teaching?

15. How are residents' teaching skills assessed?

16. Is there a specific tool to evaluate teaching skills?

INTERPERSONAL AND COMMUNICATION SKILLS

Residents must be able to demonstrate interpersonal and communication skills that result in effective information exchange and teaming with patients, their patients families, and professional associates. Residents are expected to:

- create and sustain a therapeutic and ethically sound relationship with patients
- use effective listening skills and elicit and provide information using effective nonverbal, explanatory, questioning, and writing skills
- work effectively with others as a member or leader of a health care team or other professional group

Oral Communication

Identify the specific methods the program uses to ensure that residents achieve competence in communicating with patients, families, and other colleagues within the medical profession.

- 17.** How and by whom are interpersonal and communication skills evaluated?

Written Communication

- 18.** Describe how the resident's written communication is reviewed.

19. How is feedback given to the resident regarding quality of written communication?

20. How is the timely completion of medical records tracked?

21. How and by whom is feedback given to residents regarding timely completion of medical records?

PROFESSIONALISM

Residents must demonstrate a commitment to carrying out professional responsibilities, adherence to ethical principles, and sensitivity to a diverse patient population. Residents are expected to:

- demonstrate respect, compassion, and integrity; a responsiveness to the needs of patients and society that supercedes self-interest; accountability to patients, society, and the profession; and a commitment to excellence and on-going professional development
- demonstrate a commitment to ethical principles pertaining to provision or withholding of clinical care, confidentiality of patient information, informed consent, and business practices
- demonstrate sensitivity and responsiveness to patients' culture, age, gender, and disabilities

22. Identify specific methods the program uses to teach the elements of professional competence.

29. How does the program address remediation with the intent of practice improvement for breaches of professionalism?

SYSTEMS-BASED PRACTICE

Residents must demonstrate an awareness of and responsiveness to the larger context and system of health care and the ability to effectively call on system resources to provide care that is of optimal value. Residents are expected to:

- understand how their patient care and other professional practices affect other health care professionals, the health care organization, and the larger society and how these elements of the system affect their own practice
- know how types of medical practice and delivery systems differ from one another, including methods of controlling health care costs and allocating resources
- practice cost-effective health care and resource allocation that does not compromise quality of care
- advocate for quality patient care and assist patients in dealing with system complexities
- know how to partner with health care managers and health care providers to assess, coordinate, and improve health care and know how these activities can affect system performance

30. Address how the elements of this competency are taught by describing content and methods of teaching.

31. Describe the resident activity that fulfills the requirement for experimental learning to address the system-causes of errors.

32. Who guides/supervises the residents in this activity?

DIDACTIC COMPONENTS

In addition to structured didactic conferences, what other methods of learning does your program use to foster continuous professional development of residents (e.g., self-directed learning modules, small group sessions, workshops etc). Please check all that apply and identify the content of these learning activities. **Learning Venue**

Place an "X" in this column if used

Content Addressed

Self-directed learning modules

Small group discussions

Workshops

Simulation

Other learning activities (identify):

EVALUATION

The ability to demonstrate educational outcomes as the achievement of competency-based learning objectives provides evidence of preparing competent physicians who can meet the health care needs of the public. Educational assessment is, therefore, a key component of the Outcome Project and is intended to:

1. Assess residents' attainment of competency-based objectives
2. Facilitate continuous improvement of the educational experience
3. Facilitate continuous improvement of resident performance
4. Facilitate continuous improvement of residency program performance

Assessment is defined as the "process of collecting, synthesizing, and interpreting information to aid decision-making".¹ The results of an assessment should allow sound inferences about what learners know, believe, and can do² in defined contexts. Assessment, therefore, integrates several concepts, which are described below.

Assessment Instrument or Approach

1. **The assessment approach provides valid data.**

Valid data provide accurate information about what is being assessed. Different types of evidence may be used to infer validity. It may be inferred when assessment results help to predict performance in actual practice. Validity may be inferred also when it is possible to detect change (responsiveness). This occurs, for example, when residents perform poorly on a cardiology assessment prior to completing a cardiology rotation, but perform well on the same assessment following the rotation. In addition, validity may be inferred when there is a strong relationship between data obtained and external indicators (discriminative validity). An example of the latter occurs when medical students perform poorly and cardiologists perform well on the same cardiology quiz. As knowledge about complex assessment advances, however, it is possible that perspectives on validity also will evolve.
2. **The assessment approach yields reliable data.**

An assessment approach may be considered reliable when it yields consistent results regardless of when it is used, who uses it, and which item or case is assessed. The importance of a specific type of reliability depends upon what is being assessed and the method by which it is being assessed. Generally speaking, reliability or generalizability coefficients of 0.8 and higher are desired. Inter-observer or inter-rater reliability is an indicator that different assessors have provided similar ratings for the same performance. Inter-case or inter-item reliability is the degree of consistency in an individual's performance across different cases, situations, or items. Test-retest reliability is an indicator of consistency over time. Generalizability theory offers an alternative approach to assessing the individual reliabilities listed above by allowing examination of specific sources of unreliability and providing an overall reliability index termed a G coefficient.
3. **The assessment approach is feasible.**

Feasibility depends on several issues that include the following: time and training required to implement the assessment, equipment or technology required, number of assessments required per examinee, financial cost, and the extent to which an assessment has been used.
4. **The assessment approach is likely to apply to my assessment circumstances (external validity).**

When choosing an assessment approach, the conditions in which an assessment has been previously conducted should be considered. These conditions include the purpose for which the assessment was used, the characteristics of those assessed and the assessors, and the setting in which the assessment was conducted. Assessments that have been used in testing centers, for instance, may require modification for use in clinics or wards where the pace may vary and interruptions may occur.
5. **The assessment provides valuable information.**

In terms of value, assessment should provide new and useful information that facilitates teaching and learning. For instance, the assessment should allow the collection of enough detailed information that it is possible to know what performance improvements or curricular modifications are needed.

Assessment System

1. **Assessment is consistent with curriculum/program objectives.**
Consistency between objectives and assessment occurs when there are clear parallels between what is taught and what is assessed. If , for example, a course is designed to improve knowledge and procedural skills required to conduct upper endoscopies, then both knowledge and skills in this area should be assessed. Consistency between objectives and assessment also increases the likelihood that learners will attend to a broader scope of course objectives and not just content that will be assessed.
2. **The educational objectives are representative of the educational domains of interest.**
It is not feasible to assess attainment of all educational objectives in all contexts, therefore, it is necessary to select a sample of what will be assessed. Representative behaviors for each competency in defined contexts should be identified. For the medical knowledge competency, identification may be guided by considering, for instance, common acute and chronic problems that occur in ambulatory settings of specific specialties. For the professionalism competency, development of educational objectives might be guided by considering common ethical dilemmas, relevant cultural contexts of patient care, and key professional courtesies intrinsic to patient care and teamwork for specific specialties in defined settings.
3. **Multiple assessment approaches/instruments are employed.**
Because competence is multi-dimensional and individual assessment approaches have limitations, it is unlikely that a single approach to assessment will be adequate. This problem is addressed by using a few different assessment approaches.
4. **Multiple observations are conducted.**
Multiple observations improve the reliability or precision of assessment and allow identification of patterns of behavior over time.
5. **Multiple observers/raters provide assessments.**
Using multiple observers improves the reliability or precision of assessment and enhances the scope of assessment.
6. **Performance is assessed according to pre-specified standards or criteria.**
Pre-specified standards indicate objective criteria for "good enough" or "borderline" performance and help to reduce subjective assessment.
7. **Assessment is fair.**
Fairness pertains to giving all learners the same or equal opportunity to perform. While fairness may be enhanced by valid and reliable assessment, an assessment may still be unfair if the results are influenced by something other than ability. For example, it would be unfair to compare the assessment results of a learner who was on call the night before an assessment with the results of peers who were not on call. With the exception of baseline or needs assessments, fairness pertains also to providing learners opportunities to learn the material on which they will be assessed. Learners should be informed about what will and will not be assessed. In addition, there should be clarity about the assessment format and how performance will be rated.

References

¹ Airasian PW. Classroom assessment (3rd ed.). New York: McGraw-Hill, 1997.

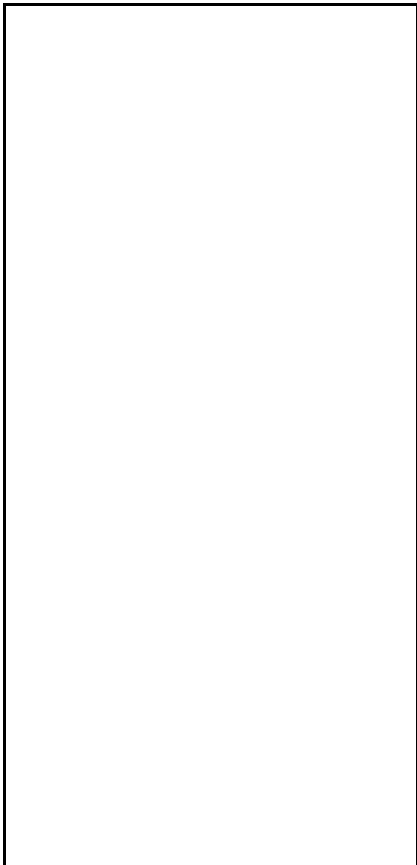
² McMillan JH. Essential assessment concepts for teachers and administrators. Thousand Oaks, CA: Corwin Press, Inc., 2001.

Resident

Using the table on the below, provide the methods of evaluation
 In addition to structured didactic conferences, what other
 methods of learning does your program use to foster
 continuous professional development of residents (e.g., self-
 directed learning modules, small group sessions, workshops
 etc). Please check all that apply and identify the content of
 these learning activities.

Competency	Methods of Evaluation	Evaluator(s)
Patient Care		
Medical Knowledge		
Practice-based learning & improvement		
Interpersonal & communication skills		
Professionalism		
Systems-based practice		

33. How does the program make residents aware of the performance criteria on which they will be evaluated?



34. By what mechanism, how frequently, and by whom is formal feedback provided to the residents?

42. How many faculty participate?

43. How many residents participate?

44. Are the minutes of these meetings documented?

GLOSSARY

44. Are the minutes of these meetings documented?

Assessment:

In his book, *Classroom Assessment*, (Airasian PW. Classroom assessment (3rd ed.). New York: McGraw-Hill, 1997), Airasian defines assessment as the "process of collecting, synthesizing, and interpreting information to aid decision-making". (see further, "[Considerations for Selecting and Implementing Assessment Approaches/Instruments.](#)")

Certification:

The intent of the certification of physicians is to provide assurance to the public that a physician specialist certified by a Member Board of the American Board of Medical Specialties (ABMS) has successfully completed an approved educational program and an evaluation process which includes an examination designed to assess the knowledge, skills, and experience required to provide quality patient care in that specialty (taken from the *ABMS Annual Report and Reference Handbook*). Physicians who are successful in achieving certification are called diplomates of the respective specialty board.

Core Curriculum:

The term "core curriculum" is *not* an official term used in any of the ACGME's requirements. The term, however, has developed among practitioners when

referring to those elements of a resident's curriculum common across all specialties. These common elements are now incorporated into the general competencies. The competencies themselves do not constitute a curriculum. Rather, they are the organizing principles upon which a core curriculum can be developed.

Curriculum:

A curriculum is a formal educational plan based on results of a needs assessment, and including goals and objectives developed to meet the needs identified, educational activities through which the plan is implemented, and evaluation of the plan with feedback to provide continued improvement in the educational process.

Dreyfus Model:

The research of Hubert and Stuart Dreyfus demonstrated what has become a widely-accepted model of how individuals progress through various levels in their acquisition of skill. The Dreyfus brothers labeled individuals in these progressive stages as novice, advanced beginner, competent, proficient, and expert. These stages should be reflected in curriculum planning when considering at which appropriate levels residents should be introduced to particular skills.

Educational Taxonomy:

Taxonomies were developed in recognition that learning occurs in various domains, i.e., cognitive, affective, and psychomotor. Most often, taxonomies are used with regard to cognitive learning. While Benjamin Bloom and his colleagues developed the most recognized taxonomy, other individuals such as Marzano have proposed other taxonomies that organize cognitive knowledge in different ways. Taxonomies are useful in the development of educational objectives since they typically use particular verbs to specify desired learner behaviors that can be assessed at each level of knowledge acquisition.

Formative Evaluation:

In formative evaluation, findings are accumulated from a variety of relevant assessments designed for use either in program or resident evaluation. In resident evaluation, the formative evaluation is intended to provide constructive feedback to individual residents during their training. In program evaluation, formative evaluation is intended to improve program quality. In either situation, formative evaluation is not intended to make a go/no-go decision.

General Competencies:

The six general competencies endorsed by the ACGME at its September 1999 meeting are patient care, medical knowledge, interpersonal and communication skills, practice-based learning and improvement, professionalism, and systems-based practice. Language related to the general competencies has been added by the Residency Review Committees to each set of core Program Requirements and by the Institutional Review Committee to the Institutional Requirements. The competencies act as organizing principles for the curricula of all core specialty programs and reflect the expectation that graduating residents should exhibit behaviors reflective of these competencies at a level appropriate to an independent practitioner. The American Board of Medical Specialties (ABMs) has also endorsed

the general competencies for use by certifying boards in the examination and recertification of physicians.

Generalizability:

Measurements (scores) derived from an assessment tool are considered generalizable if they can be shown to apply to more than the sample of cases or test questions used in a specific assessment.

Goal (educational):

An educational goal states the broad target of an educational effort. Goals are typically not measurable, but offer a general focus for an activity or set of experiences.

Graduate Medical Education Core Curriculum(AAMC):

This report from an AAMC working group presents five domains of learning that comprise the core curriculum: biomedical ethics, scholarly medical practice, communication in medicine, medical professionalism, and the healthcare system. For each domain, the report presents examples of measurable learning objectives. The terminology used to identify the domains differs from the general competencies. However, a table identifying parallel relationships between the competencies and the domains provides easy reference for how the objectives can be incorporated into GME competency-based curricula.

Objective Educational:

An educational objective is a measurable target to be achieved by an educational activity or intervention. The educational objective specifies the educational outcome to be assessed.

Outcomes Assessment (educational):

Outcomes are results providing evidence that goals and objectives have been accomplished. In the context of the ACGME Outcome Project, educational outcomes assessment refers to intermediate or end results of the educational process. General categories of outcomes relevant to determining educational program effectiveness include: student/resident outcomes (e.g., learning or development of knowledge, skills, and attitudes); graduate/alumni outcomes; faculty outcomes (e.g., improved teaching, increased knowledge, etc.); patients and society in general (e.g., better treatment, access to care, improved health); departmental outcomes (e.g., improved facilities, clinical benchmarks, etc.); and institutional outcomes (e.g., improved quality rating, staff satisfaction, etc.) Outcomes can occur (and be measured) at any time or point in a process, such as during a patient encounter, during a conference, throughout a rotation, throughout the educational program, etc. Outcomes can be immediate, short term, delayed, and long term.

Reliability/Reproducibility/Dependability:

A reliable test score means that when measurements (scores) are repeated, the new test results are consistent with the first scores for the same assessment tool on the same or similar individuals. Reliability is measured as a correlation with 1.0 being perfect reliability and below 0.50 as unreliable. Evaluation measurement reliabilities above 0.65 and preferably near or above 0.85 are recommended. The terms reproducibility and dependability are often used interchangeably with reliability.

Summative Evaluation:

In summative evaluation, findings and recommendations are designed to accumulate all relevant assessments for a go/no-go decision. In resident evaluation, the summative evaluation is used to decide whether the resident qualifies to continue to the next training year, should be dropped from the program, or at the completion of the residency, should be recommended for board certification. In program evaluation, summative evaluation is used to judge whether the program meets the accepted standards for the purpose of continuing, restructuring, or discontinuing the program.

Validity:

Validating assessment measures is a process of accumulating evidence about how well the assessment measures represent or predict a resident's ability or performance. Validity refers to the specific measurements made with assessment tools in a specific situation with a specific group of individuals. It is the scores, not the type of assessment tool that are valid. For example, it is possible to determine if the written exam scores for a group of residents are valid in measuring the residents' knowledge, but it is incorrect to say that "all written exams" are valid to measure knowledge.