Assessment in Medical Education

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DISCLOSURE STATEMENT

Priya Garg, MD

Has documented that she has nothing to disclose.
Objectives

● Discuss the construct of CBME and assessment’s role
● Define assessment and its methods and how to apply them to curricular design
● Define the hierarchy assessments
● Evaluate your current assessment tools
● Develop an implementation guide for an EPA
As the faculty on the inpatient floor, you receive a form from the clerkship director asking you to evaluate the third year medical student’s knowledge, professionalism, patient care and communication skills. You really enjoyed working with the student and thought she was a great member of the team. You are looking at each section and are trying to determine whether to mark below expectation, meets expectation or exceeds expectation....
Thinking of students you assess, how do you make decisions? What do you think about?
All too familiar...

Meets expectation for a 3rd year?
Principles of Competency Based Medical Education

• Competency-based system of education requires four components:
  (1) identifying the outcomes
  (2) defining performance levels for each competency (e.g., benchmarks and milestones)
  (3) developing a framework for assessing competencies
  (4) continuous evaluation of the CBME program to see if it is indeed producing the desired outcomes—in this case, competent physicians.
Curriculum

- Competencies
- Goals and Objectives
- Assessment and Evaluation
- Content and Teaching Methods
Assessment vs Evaluation

1. Desired outcomes (students will be able to...)
2. Content
3. Teaching
4. Learning
5. Assessment
6. Evaluation
Determining competence in these domains using standardized assessment tools remains a challenge in medical education.

**Table 1. ACGME Core Competencies [10]**

<table>
<thead>
<tr>
<th>Domain</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Patient Care</strong></td>
<td>The ability to provide patient care that is compassionate, appropriate, and effective for the treatment of health problems and the promotion of health.</td>
</tr>
<tr>
<td><strong>Medical knowledge</strong></td>
<td>Demonstration of knowledge of the established and evolving biomedical, clinical, epidemiological and social-behavioral sciences, as well as the application of this knowledge to patient care.</td>
</tr>
<tr>
<td><strong>Practice-based learning and improvement</strong></td>
<td>The ability to investigate and evaluate one’s care of patients, to appraise and assimilate scientific evidence, and to continuously improve patient care based on constant self-evaluation and life-long learning.</td>
</tr>
<tr>
<td><strong>Interpersonal and communication skills</strong></td>
<td>Demonstrates interpersonal and communication skills that result in the effective exchange of information and collaboration with patients, their families, and health professionals.</td>
</tr>
<tr>
<td><strong>Professionalism</strong></td>
<td>Demonstration of a commitment to carrying out professional responsibilities and an adherence to ethical principles.</td>
</tr>
<tr>
<td><strong>Systems-based practice</strong></td>
<td>Demonstrates awareness of and responsiveness to the larger context and system of health care, as well as the ability to call effectively on other resources in the system to provide optimal health care.</td>
</tr>
</tbody>
</table>
Where are the assessments?

SBP2. Incorporates cost awareness and risk-benefit analysis into patient care

<table>
<thead>
<tr>
<th>Level 1</th>
<th>Level 2</th>
<th>Level 3</th>
<th>Level 4</th>
<th>Level 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Entry</td>
<td>Recognizes the concept of cost-benefit analysis associated with obtaining and providing health care. Identities basic laboratory and radiographic tests that are commonly performed, recognizing that each is associated with specific costs.</td>
<td>Knows common socio-economic barriers that impact patient care. Describes how cost-benefit analysis is applied to patient care.</td>
<td>In addition, identifies the role of various health care stakeholders (health care systems, hospitals, insurance carriers, health care providers, etc.) and their varied impact on the cost of and access to health care.</td>
<td>Consistently incorporates cost awareness and risk-benefit principles into all clinical scenarios. Masterfully uses common and highly-specialized equipment within the OR.</td>
</tr>
</tbody>
</table>

Milestone: Knows relative costs of frequently used diagnostic and therapeutic interventions, such as CT vs. MRI scans, and the extent and ways they contribute to diagnostic accuracy and positive patient outcomes.
Based on Holistic Evaluation

Operative Performance Rating Scales
Mock Orals
End-of-Rotation Evaluations
Self Evaluations
Case Logs
Nursing and Ancillary Personnel Evaluations
ITE
Sim Lab
Student Evaluations
Clinic Workplace Evaluations
OSCE
Peer Evaluations
Patient/ Family Evaluations
Clinical Competency Committee
Assessment of Milestones

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<table>
<thead>
<tr>
<th>GQ 4 or 5</th>
<th>Program Directors All or most</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Gather a history and perform a physical examination</td>
<td>94.9%</td>
</tr>
<tr>
<td>2. Prioritize a differential diagnosis following a clinical encounter</td>
<td>88.3%</td>
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<tr>
<td>3. Recommend and interpret common diagnostic and screening tests</td>
<td>83.9%</td>
</tr>
<tr>
<td>4. Enter and discuss orders/prescriptions</td>
<td>54.9%</td>
</tr>
<tr>
<td>5. Document a clinical encounter in the patient record</td>
<td>89.4%</td>
</tr>
<tr>
<td>6. Provide an oral presentation of a clinical encounter</td>
<td>88.6%</td>
</tr>
<tr>
<td>7. Form clinical questions and retrieve evidence to advance patient care</td>
<td>87.9%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>GQ 4 or 5</th>
<th>Program Directors All or most</th>
</tr>
</thead>
<tbody>
<tr>
<td>8. Give or receive a patient handover to transition care responsibility</td>
<td>77.3%</td>
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<tr>
<td>9. Collaborate as a member of an interprofessional team</td>
<td>91.9%</td>
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<tr>
<td>10. Recognize a patient requiring urgent or emergent care, and initiate evaluation and management</td>
<td>82.9%</td>
</tr>
<tr>
<td>11. Obtain informed consent for tests and/or procedures</td>
<td>79.9%</td>
</tr>
<tr>
<td>13. Identify system failures and contribute to a culture of safety and improvement</td>
<td>67.1%</td>
</tr>
</tbody>
</table>
13 EPA’S

1. Gather a history and perform a physical exam*
2. Prioritize a differential diagnosis after a clinical encounter
3. Recommend and interpret common diagnostic and screening tests
4. Enter and discuss orders and prescriptions
5. Document a clinical encounter in the patient record*
6. Provide an oral presentation of a clinical encounter*
7. Form clinical questions and retrieve evidence to advance patient care
8. Give or receive a patient handover to transition care responsibility
9. Collaborate as a member of an interprofessional team
10. Recognize a patient requiring urgent or emergent care and initiate evaluation and management
11. Obtain informed consent for tests or procedures
12. Perform general procedures of a physician*
13. Identify system failures and contribute to a culture of safety and improvement
Assessment is the process of gathering and discussing information from multiple and diverse sources in order to develop a deep understanding of what students know, understand, and can do with their knowledge as a result of their educational experiences; the process culminates when assessment results are used to ...
Assessment Drives Learning
Progression of Learning

- **Knows** (Knowledge)
- **Knows how** (Competence)
- **Shows** (Performance)
- **Does** (Action)

THE KIRKPATRICK MODEL

Outcome
• Did learning result in the expected ROI

Behavior
• Did learning cause a behavior change?

Learning
• Did learners do well on assessments?

Satisfaction
• Did learners enjoy the training?
ACTIVITY 1

Think- Pair Share

Think about the program, course, curriculum you teach in and the ways the learner’s are assessed and where are they on the pyramid?
Figure 1. Miller’s Pyramid Framework for Clinical Assessment. Adapted from Miller GE. The Assessment of clinical skills/competence/performance.
TYPES OF ASSESSMENT
Formative Assessment

- Assessments may be formative or summative
- Formative assessment is designed to promote the development of the learner
  - Promoting reflection
  - Guiding future learning
  - Shaping values
Formative assessment is a tool for identifying a learner’s strengths and weaknesses and allows for self reflection and action
FOCUS: FEEDBACK AND OBSERVATION OF CLINICAL SKILLS

Student Name: ____________________________ Date: __________
Observer Name: __________________________ Clerkship week #: __________
Circle One: Resident Attending

ORAL PRESENTATION SKILLS: The critical element of the structured observation is to provide specific and timely feedback to the student.
Set expectations:
1. Ask student about any specific areas on which to focus the observation and feedback
2. Ask student about any specific areas they want to work on

Feedback suggestions:
1. Encourage student self-assessment ("How did it go?")
2. Be specific: describe specific behaviors - use CSEF behaviors below as prompts
3. Give positive and constructive feedback: 2 positives and 2 areas for improvement with an action plan to improve skills

ORAL PRESENTATION

<table>
<thead>
<tr>
<th>Target behaviors</th>
<th>Comments - specific examples of behaviors observed or missing</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Delivers well-organized presentation for this patient encounter</td>
<td></td>
</tr>
<tr>
<td>2) Accurately reports patient data (history, exams, tests)</td>
<td></td>
</tr>
<tr>
<td>3) Delivers presentation that is focused, concise and flows well</td>
<td></td>
</tr>
<tr>
<td>4) Oral presentation demonstrates appropriate level of confidence</td>
<td></td>
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<tr>
<td>Reach behaviors</td>
<td></td>
</tr>
<tr>
<td>5) Organization of the history and physical demonstrates a differential diagnosis-driven presentation</td>
<td></td>
</tr>
<tr>
<td>6) Presentation is customized to the listener(s), working environment and time available</td>
<td></td>
</tr>
<tr>
<td>7) Presentation is clear, logical and convincing</td>
<td></td>
</tr>
</tbody>
</table>

Action Plan: (Next steps for student):

1. 
2. 
3.  

Boston University School of Academic Affairs
Summative Assessment

- Judging of an individual’s cognitive achievement or clinical performance
- Composite summary of performance
- Used to make decisions about the learner
ASSESSMENT METHODS
Choosing Assessment Methods

• The type of assessment method chosen should align with the nature of the knowledge, skills, or behaviors to be assessed.
• The context, or clinical setting in which the assessment is conducted should be carefully considered.
• For assessment to be meaningful, the data collected should represent performance close to the setting and conditions that would occur in the real world context.
<table>
<thead>
<tr>
<th>Method</th>
<th>Domain</th>
<th>Type of Use</th>
<th>Limitations</th>
<th>Strengths</th>
</tr>
</thead>
<tbody>
<tr>
<td>Written exercises</td>
<td>Knowledge, ability to solve problems</td>
<td>Summative assessments within courses or clerkships; national in-service, licensing, and certification examinations</td>
<td>Difficult to write, especially in certain content areas; can result in cueing; can seem artificial and removed from real situations</td>
<td>Can assess many content areas in relatively little time, have high reliability, can be graded by computer</td>
</tr>
<tr>
<td>Key-feature and script-concordance questions</td>
<td>Clinical reasoning, problem-solving ability, ability to apply knowledge</td>
<td>National licensing and certification examinations</td>
<td>Not yet proven to transfer to real-life situations that require clinical reasoning</td>
<td>Assess clinical problem-solving ability, avoid cueing, can be graded by computer</td>
</tr>
<tr>
<td>Short-answer questions</td>
<td>Ability to interpret diagnostic tests, problem-solving ability, clinical reasoning skills</td>
<td>Summative and formative assessments in courses and clerkships</td>
<td>Reliability dependent on training of graders</td>
<td>Avoid cueing, assess interpretation and problem-solving ability</td>
</tr>
<tr>
<td>Structured essays</td>
<td>Synthesis of information, interpretation of medical literature</td>
<td>Preclinical courses, limited use in clerkships</td>
<td>Time-consuming to grade, must work to establish interrater reliability, long testing time required to encompass a variety of domains</td>
<td>Avoid cueing, use higher-order cognitive processes</td>
</tr>
<tr>
<td>Assessments by supervising clinicians</td>
<td>Clinical skills, communication, teamwork, presentation skills, organization, work habits</td>
<td>Global summative and sometimes formative assessments in clinical rotations</td>
<td>Often based on second-hand reports and case presentations rather than on direct observation, subjective</td>
<td>Use of multiple independent raters can overcome some variability due to subjectivity</td>
</tr>
<tr>
<td>Structured direct observation with checklists for ratings (e.g., mini-clinical-evaluation exercise or video review)</td>
<td>Communication skills, clinical skills</td>
<td>Limited use in clerkships and residencies, a few board-certification examinations</td>
<td>Selective rather than habitual behaviors observed, relatively time-consuming</td>
<td>Feedback provided by credible experts</td>
</tr>
<tr>
<td>Oral examinations</td>
<td>Knowledge, clinical reasoning</td>
<td>Limited use in clerkships and comprehensive medical school assessments, some board-certification examinations</td>
<td>Subjective, sex and race bias has been reported, time-consuming, require training of examiners, summative assessments need two or more examiners</td>
<td>Feedback provided by credible experts</td>
</tr>
<tr>
<td><strong>Clinical simulations</strong></td>
<td><strong>Incorporated standardized patients</strong></td>
<td><strong>High technology simulations</strong></td>
<td><strong>Multisource (“360-degree”) assessments</strong></td>
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</tr>
<tr>
<td>Standardized patients and objective structured clinical examinations</td>
<td>Actual practice habits</td>
<td>Procedural skills, teamwork, simulated clinical dilemmas</td>
<td>Peer assessments</td>
<td></td>
</tr>
<tr>
<td>Some clinical skills, interpersonal behavior, communication skills</td>
<td>Primarily used in research; some courses, clerkships, and residencies use for formative feedback</td>
<td>Formative and some summative assessment</td>
<td>Professional demeanor, work habits, interpersonal behavior, teamwork</td>
<td></td>
</tr>
<tr>
<td>Formative and summative assessments in courses, clerkships, medical schools, national licensure examinations, board certification in Canada</td>
<td>Requires prior consent, logistically challenging, expensive</td>
<td>Timing and setting may seem artificial, require suspension of disbelief, checklists may penalize examinees who use shortcuts, expensive</td>
<td>Confidentiality, anonymity, and trainee buy-in essential</td>
<td></td>
</tr>
<tr>
<td>Timing and setting may seem artificial, require suspension of disbelief, checklists may penalize examinees who use shortcuts, expensive</td>
<td>Tailored to educational goals; reliable, consistent case presentation and ratings; can be observed by faculty or standardized patients; realistic</td>
<td>Tailored to educational goals, can be observed by faculty, often realistic and credible</td>
<td>Ratings encompass habitual behaviors, credible source, correlates with future academic and clinical performance</td>
<td></td>
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</tbody>
</table>

**Multisource (“360-degree”) assessments**

- **Peer assessments**
  - Professional demeanor, work habits, interpersonal behavior, teamwork
  - Formative feedback in courses and comprehensive medical school assessments, formative assessment for board recertification
  - Confidentiality, anonymity, and trainee buy-in essential
  - Ratings encompass habitual behaviors, credible source, correlates with future academic and clinical performance

- **Patient assessments**
  - Ability to gain patients’ trust; patient satisfaction, communication skills
  - Formative and summative, board recertification, use by insurers to determine bonuses
  - Provide global impressions rather than analysis of specific behaviors, ratings generally high with little variability
  - Credible source of assessment

- **Self-assessments**
  - Knowledge, skills, attitudes, beliefs, behaviors
  - Formative
  - Do not accurately describe actual behavior unless training and feedback provided
  - Foster reflection and development of learning plans

- **Portfolios**
  - All aspects of competence, especially appropriate for practice-based learning and improvement and systems-based practice
  - Formative and summative uses across curriculum and within clerkships and residency programs, used by some U.K. medical schools and specialty boards
  - Learner selects best case material, time-consuming to prepare and review
  - Display projects for review, foster reflection and development of learning plans
<table>
<thead>
<tr>
<th>Rating forms</th>
<th>Y</th>
<th>Y</th>
<th>Y</th>
<th>Y</th>
<th>Y</th>
<th>Y</th>
<th>Y</th>
<th>Y</th>
<th>N</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self-assessment</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>N</td>
<td>N</td>
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<tr>
<td>Essays/journals</td>
<td>Y</td>
<td>Y</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>Y</td>
<td>Y</td>
<td>N</td>
<td>N</td>
<td>Y</td>
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<tr>
<td>Written or computer-based</td>
<td>N</td>
<td>Y</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>Y</td>
<td>N</td>
<td>N</td>
<td>Y</td>
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<td>constructed response tests</td>
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<td>Oral exams</td>
<td>Y</td>
<td>Y</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>Y</td>
<td>Y</td>
<td>N</td>
<td>Y</td>
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<tr>
<td>Direct observation including</td>
<td>N</td>
<td>N</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>N</td>
<td>Y</td>
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<td>OSCEs</td>
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</table>

Recommended uses and strengths of common assessment methods.
APPROACH TO ASSESSMENT
6 Step Approach to Assessment

- Decide what you *want* to assess?
- The *purpose* of your assessment?
- The *setting* you use to perform the assessment?
- What *method*?
- What you will do with the *results* of each assessment?
- What *challenges* exist with your assessment method?
I need your help

The medical school is trying to measure the EPA’s and are trying to figure out what assessments you use, where and when.

Break into groups of three.
Challenges in Assessment

- The use of multiple methods of assessment can overcome many of the limitations of individual assessment formats.
- Although competencies exist, tools of assessment are hard to develop and find.
- Assessment can have both intended and unintended consequences.
- The evidence that assessment protects the public from poor-quality care is both indirect and scarce.
References


Carraccio, C. L., Hicks, P. J., Burke, A. E., Jones, M. D., Ludwig, S., Mcguinness, G. A., ... Schwartz, A. (n.d.). Assessment in Graduate Medical Education: A Primer for Pediatric Program Directors.