Competencies, Milestones, and EPAs: How can they help both assessment and learning?

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Disclosure

I have no conflicts of interest.
Objectives

• To define competency-based medical education, milestones, EPAs

• To characterize assessment for learning

• To describe a strategy to implement a program of assessment
Challenges in assessment

STUDENT
If you choose to rate me at the highest level....

RESIDENT
Everyone tells me I’m ‘doing great’ in rotations. I don’t know why I never get useful feedback.

CCC member
These milestone ratings are too detailed; they don’t really tell us about how our residents or fellows are doing.

CLINICAL TEACHERS
This fellow has fine evaluations, but we are all worried about his professionalism.

ATTENDING
This evaluation form is so long. I can barely even remember this resident.
Outcomes based assessment

What is taught: structure and process

What is learned: clearly defined outcomes

- Learners take active role in their education & assessment in authentic clinical setting
- Formative feedback from multiple assessors using multiple methods

Carraccio, Acad Med 2016
Advancing Competency-Based Medical Education: 3 principles

1. Medical education must be based on health needs of the population
2. Primary focus of training should be outcomes for learners rather than structure and process of the educational system
3. Formation of a physician should be seamless across the continuum of education, training, and practice

Carraccio, Acad Med 2016
CBME: Outcomes-based education through backwards design

1. Identify **Outcomes** (Physician of the future, your vision, competencies)
2. Define Performance Levels for the Competencies (Milestones)
3. Develop and apply assessment framework (i.e. program of assessment, EPAs)
4. Provide relevant curricular opportunities
5. Continuous evaluation to see if program is producing competent physicians
Competencies and milestones

- Competency: observable ability of a health professional that integrates knowledge, skills, values, and attitudes
- Milestone: observable marker of an individual’s ability that expresses the stepwise progression of expertise.

![Diagram showing transitions in patient care across health delivery systems](image-url)
Of course, there are criticisms...

What concerns have you heard about CBME?
Critiques of CMBE

• “I turned out fine”
• Too many forms and checklists - reductionism
• Competence is a minimal standard; we train for excellence
• Where is the evidence? Is it valid?
• Is it just a fad?
Miller’s pyramid of competence
Entrustable Professional Activity (EPA): a framework for assessment

- Start by identifying the physician activities you want the trainee to be able to perform
  - Take a history
  - Deliver a baby

What information is needed to determine if trainee can perform the activity competently?

Look ahead to predict future performance (trust)

Now
Competencies vs EPAs

<table>
<thead>
<tr>
<th>Competencies</th>
<th>EPAs</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Describe the person</strong></td>
<td><strong>Describe the work</strong></td>
</tr>
<tr>
<td>knowledge, skills, attitudes, values</td>
<td>essential parts of professional practice</td>
</tr>
<tr>
<td>content expertise collaboration ability management ability professional attitude</td>
<td>insert central line perform an appendectomy lead a family meeting manage a ventilated patient</td>
</tr>
</tbody>
</table>
EPAs operationalize competencies and milestones

<table>
<thead>
<tr>
<th>EPA (observable)</th>
<th>Competencies (inferred)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Taking first history and physical of neurology patients</td>
<td>X</td>
</tr>
<tr>
<td>2. Performing lumbar punctures</td>
<td>X</td>
</tr>
<tr>
<td>3. Care for stroke patients</td>
<td>X</td>
</tr>
<tr>
<td>4. Care for patients with lumbosacral radicular complaints</td>
<td>X</td>
</tr>
<tr>
<td>5. Care for patients with a carpal tunnel syndrome (CTS)</td>
<td>X</td>
</tr>
</tbody>
</table>

Mulder Med Teach 2010
Entrustment

1. Not allowed to practice the activity
2. Practice with full supervision
3. Practice with supervision on demand
4. Supervision at a distance or after the activity
5. Supervise others
EPAC: Pediatrics pilot

• Goal: Establish a **time-variable** model of medical education with meaningfully-assessed demonstration of competence and **deliberate entrustment** of responsibility across the UME-GME continuum.

• Longitudinal integrated clerkship -> pediatric residency
• AAMC Core EPAs -> pediatric milestones
Does CBME work? Is it valid?

• Criteria for good assessment

  • CARVE
    • Cost effective
    • Acceptable
    • Reliable – reproducible, consistent
    • Valid
    • Educational impact, catalytic effect

Norcini et al, Med Teach 2011
Evidence of validity: Kane

Scoring
- Clinical observation
- Test item

Generalization
- Sampling
- Reproducibility

Extrapolation
- Discriminating different groups
- Correlation with other measures

Implications
- Pass fail decision
- Consequences: advancement, remediation

Kane
Cook, Med Educ 2015
Evidence of validity: milestones
Objectives

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• To describe a strategy to implement a program of assessment
Assessment for learning

An information-rich approach ...to collect and combine information from various sources to inform about the strengths and weaknesses of each individual student, with the purpose to optimize their learning.

The central goal is not whether John is better than Jill or better than a cut score, but to determine whether John is maximally better today than he was yesterday, or whether Jill will be maximally better tomorrow than she is today.

Schuwirth, Med Teach 2011
Assessment for learning

- Collaboration between learner and teacher
- Frequent feedback
- Explicit learning and performance criteria
- Learner engagement: planning, identifying next steps
  - self-directed assessment seeking

Murdoch-Eaton, Med Teach 2017
Telio, Med Educ 2015
Eva, J Cont Educ Health Prof 2008
• When the cook tastes the soup, that's formative

• When the guests taste the soup, that's summative
Assessment *for* learning

- Intentionally planned learning activities
- Frequent observations of the learner
- Active learner role: planning, reflecting, re-trying
Summative assessment = Assessment of learning

• Higher stakes
• Less frequent than formative assessment
• Less feedback to the learner
• Informs a decision

Overall judgment about readiness for advancement
Best practices in summative assessment

- Multiple assessment tools
- Multiple assessors
- Trained assessors
- Standard setting
- Consider validity: psychometric rigor and alignment with the construct of interest
- Group decision making
  - Problem identification versus developmental model

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- Clinical observation
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Assessment challenges at UCSF

• Assessment activities
  • Disconnected, ‘one off’
  • Limited view of longitudinal performance

• CBME implementation
  • Certain competencies valued more than others
  • Competencies perceived as an ‘add-on’

• Students
  • More oriented toward performance than mastery in clerkships
  • Assessment data hard to find, aggregate
  • Insufficient longitudinal mentoring
Translating Theory Into Practice: Implementing a Program of Assessment

• Aims:
  • Literature review to identify 6 guiding principles for a program of assessment
  • Built the program of assessment as we built our new curriculum
    • Bridges curriculum: 3-phase fully integrated curriculum

van der Vleuten Med Teach 2012
Lucey JAMA IM 2013
Hauer Acad Med 2017
Creating systems for outcomes based education

Centralized planning, leadership

Communication: goals, milestones

Multiple assessment tools

Continuous system improvement

Summative group decision-making

Learner engagement
- information availability
- frequent formative assessment
(1) Centrally coordinated plan for assessment aligns with and supports a curricular vision

• Bridges competencies, milestones
  • http://meded.ucsf.edu/mse/md-competencies

• Assessment team created guidelines for each of the three curricular phases and co-created assessment activities

• Student education at start of each integrated course

• In-person, video, written materials to support faculty understanding of the assessment program and procedures
(2) Multiple assessment tools used longitudinally generate multiple data points

• Create/adapt longitudinal assessment tools
  • Foundational science small group participation
  • Inquiry small group participation
  • Increased use of standardized patients for clinical skills assessments
  • Progress testing in advance of licensing exam preparation
(3) Learners require ready access to information-rich feedback to promote reflection and informed self-assessment.
(4) Mentoring is essential to facilitate effective data use for reflection and learning planning

- 55 coaches funded at 20% time for 10 hours/week
- Teach clinical, health systems skills
- Coach 6 first year, 6 third year students
The program of assessment fosters self-regulated learning behaviors:

- Individual meetings 2-4 times/year and as needed
- Reviewing feedback, dashboard
- Guided, evidence-based reflection, learning planning
- Longitudinal relationship

Goal Setting

- Specific
- Measurable
- Attainable
- Relevant
- Time-bound
Dashboard: Learning plans (PBLI)
(6) Expert groups make summative decisions about grades and readiness for advancement

• For high stakes decisions, information from multiple sources is combined

• Grading committee
  • After each integrated course, clerkship

• Academic progress committee
  • For longitudinal, competency-based performance review
Figure 1. Implementation of a Program of Assessment in a medical school

Principle 1
Centrally coordinated plan for assessment

Key Features
- Co-creation of curriculum and assessment activities
- Defined competencies, milestones and EPAs
- Assessment blueprints

Key Stakeholders
- Education leaders
- Course and clerkship directors
- Education scientists
- Curriculum committees

Principle 2
Multiple assessment tools used longitudinally to generate multiple data points

Key Features
- Open-ended question exams
- Progress testing
- Sequential clinical skills examinations
- Standard-setting meetings after high-stakes exams

Key Stakeholders
- Course teachers
- Course directors
- Exam authors and graders
- Faculty development director

Principle 3
Ready access to feedback for reflection and self-directed learning

Key Features
- Weekly formative “checkpoints” of medical knowledge
- Self-assessments of small group participation
- Brief structured clinical observations in clerkships

Key Stakeholders
- Technology designers
- Course and clerkship directors
- Course teachers
- Education scientists

Principle 4
Mentoring for reflection and learning planning by coaches

Key Features
- Coaches not involved in high-stakes assessment of own students
- Individual progress and planning meetings

Key Stakeholders
- Coaches
- Students
- Faculty development director

Principle 5
Self-regulated learning behaviors

Key Features
- Student self-assessment
- Reflection
- Goal setting with SMART learning goals

Key Stakeholders
- Coaches
- Students

Principle 6
Group decision-making for summative judgements

Key Features
- Grading committees in courses and clerkships
- Academic progress committee for longitudinal review

Key Stakeholders
- Course and clerkship directors
- Education leaders
- Data managers

Outcomes
- Alignment of learning activities and assessment
- Culture of self-improvement
- Individual student development and achievement of expected competence
Learners’ trust in the assessment system

- Opportunities to learn
- Transparency
- Accountable for own learning
- Equal and equitable

Brown, Assmt in Education 2008
Tierney, Studies in Educational Evaluation 2014
Conclusions

• CBME: define outcomes of learning and work backward to plan curriculum

• Assessment for learning: activates teachers and learners to plan and adjust approaches to learning, with periodic summative assessment

• Program of assessment: centrally designed approach to assessment that incorporates multiple data points and frequent feedback, valid summative decisions