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

Karen Hauer, MD, PhD
Associate Dean, Assessment; UCSF
February 27, 2018

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

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

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

This evaluation form is so long. I can barely even remember this
resident.

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

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

STUDENT

RESIDENT

CCC member

CLINICAL TEACHERS

Disclosure

I have no conflicts of interest.
Outcomes based assessment

What is taught: structure and process

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

Carraccio, Acad Med 2016

What is learned: clearly defined outcomes

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

Identify Outcomes (Physician of the future, your vision, competencies)
Define Performance Levels for the Competencies (Milestones)
Develop and apply assessment framework (i.e. program of assessment, EPAs)
Provide relevant curricular opportunities
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.

Englander Med Teach 2017
Internal Medicine Milestones Project 2015
Of course, there are criticisms...

What concerns have you heard about CBME?

- "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?

Critiques of CMBE

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)
### Competencies vs EPAs

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

### EPAs operationalize competencies and milestones

#### Competencies (inferred)

<table>
<thead>
<tr>
<th>EPA (observable)</th>
</tr>
</thead>
</table>

#### 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

- To define competency-based medical education, milestones, EPAs
- To characterize assessment for learning
- 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
  - Rubric identification versus developmental model

Objectives

- To define competency-based medical education, milestones, EPAs
- To characterize assessment for learning
- To describe a strategy to implement a program of assessment

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

Scoring
- Clinical observation
- Test item

Generalization
- Sampling
- Reproducibility
Extrapolation
- Discriminating different groups
- Correlation with other measures

Implications
- Pass fail decision
- Consequences: advancement, remediation
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

- Communication: goals, milestones
- Multiple assessment tools
- Centralized planning, leadership
- 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

(5) 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
(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

---

**Dashboard: Learning plans (PBLI)**

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

---

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

---

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

---

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

---

**Principle 1**
- Centrally coordinated plan for assessment

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

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

**Principle 4**
- Mentoring for reflection and learning planning by coaches

**Principle 5**
- Self-regulated learning behaviors

**Principle 6**
- Group decision-making for summative judgments

---

**Outcomes**
- Diagnosis of learning anxiety and assessment
- Enhanced self-assessment
- Individual student development and achievement of expected competence

---

**Learners’ trust in the assessment system**

**Fairness**
- 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