Realizing the Promise of Competency-based Medical Education
Disclosures

- Employed by the ACGME
- I receive royalties from Mosby-Elsevier for a textbook on assessment
- I am a member of the board of NBME and Medbiquitous
Outline

- Rationale and theories supporting a competency-based medical education
- The critical importance of the institutional environment on clinical and learning outcomes
- Describe and discuss importance of assessment and review the early EM Milestones data.
What Exactly is Competency-based Medical Education (CBME)
Competency-Based Medical Education

• Is an outcomes-based approach to the design, implementation, assessment and evaluation of a medical education program using an organizing framework of competencies

• the unit of progression is *mastery* of specific knowledge, skills and attitudes

CBME: Start with System Needs


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Early Principles: CBME

• World Health Organization (1978):
  • “The intended output of a competency-based programme is a health professional who can practise medicine at a defined level of proficiency, in accord with local conditions, to meet local needs.”

What Are The Outcomes?

- A competent (at a minimum) practitioner aligned with:
  - CMS Triple Aim

The IHI TripleAim

- Safe
- Effective
- Patient centered
- Efficient
- Timely
- Equitable

Better care for individuals, better health for populations, lower per capita costs
Origins of CBET

Scientific Management
Taylor

Behaviorism
Thorndike

Progressive Education
Dewey

Objective-based instruction
Operant conditioning

Minimum competency tests
Mastery-based learning

Criterion-referenced tests
Instructional design

CBET

McCowan; CDHS, 1998
Experiential Learning: David Kolb

Kolb's Experiential Learning Cycle

1. Concrete experience
2. Observation and reflection
3. Forming abstract concepts
4. Testing in new situations
Socio-cultural Theory: Key Principles

- Subject matter and learning processes not uniform: diverse as the people
- Learning highly influenced by social milieu
- Learning mediated by artefacts and “sign” systems (e.g. language)
- Learning situated within context where it occurs
  - Subject matter, content and process inseparable
- Adversarial interactions (people or institutions) produces different learning

Experiential Learning

Deliberate Practice

Ericsson & Lehmann, 1996:

- “Individualized training activities especially designed by a coach or teacher to improve specific aspects of an individual's performance through repetition and successive refinement.”
Deliberate Practice and Expertise

The Challenge of Deliberate Practice

Optimal

Task difficulty

Too easy

Self-monitoring
Problem solving

Too difficult

4-5 Hour Limit of full concentration

From Anders Ericsson: Used by Permission
Design and Sequencing of Training Activities

* Monitor students’ development
* Design and select training tasks for individual students

From Anders Ericsson: Used by Permission
Expert Performance vs. Everyday Skills

Ericsson KA. Acad Med. 2004
The Role of the Coach

- “They observe, they judge, and they guide”
- “That one twenty-minute discussion gave me more to consider and work on than I’d had in the past five years”
- “Medical practice is largely unseen by anyone who might raise one’s sights. I’d had no outside ears and eyes.”

Atul Gawande, New Yorker 10/3/2011
Providing High Quality Care: Does It Really Matter Where Residents and Fellows Train?
Evaluating Residency Programs Using Patient Outcomes


Rate of Major Obstetric Complications by Graduates (%)

- Residency Program of Origin, Ranked (Quintile) by Program Complication Rate

Difference remains after correction for USMLE performance

Excess Risk $\Delta$ 32%
Q1 vs Q5
Choosing a Residency

Average # of physician visits in last six months of life (teaching hospitals in red)

From: *What Kind of Physician Will You Be?*
Variation in Health Care and Its Importance for Residency Training
Dartmouth Institute for Health Policy & Clinical Practice 2012

**Figure 2.** Average number of physician per chronically ill Medicare patient during the last six months of life among patients receiving most of their care at teaching hospitals (2010 deaths)
Nostalgialitis Imperfecta

- Syndrome characterized by the following signs and symptoms:
  - “When I was an intern…<insert superlative>”
  - “Medicine was so much better 25 years ago”
    - Reality: Not really…
  - “Younger physicians today are less professional, skilled, etc. because of <insert favorite complaint>”
Harvard Medical Practice Study

- **Methods:**
  - Investigated prevalence of adverse events due to medical management
  - Review of 30,121 medical records from 51 randomly selected acute care hospitals

- **Results:**
  - Adverse events occurred in 3.7% of hospitalizations
    - 27.6% due to medical negligence
    - 13.6% resulted in death
Harvard Medical Practice Study

- Study conducted in 1984 in the state of New York
  - My senior year (1984-85) as a medical student at the University of Rochester
Past, Present and Future

“Those who forget the past are condemned to repeat it”
George Santayana

“The blind spot of contemporary [education] is experience”
Francisco Varela
The “Miracle” of Medical Education

“I Think You Should Be More Explicit Here In Step Two.”
“Every system is perfectly designed to achieve the results it generates.”

Paul Batalden
The Professional Self-Assessment “System”

Assessments within Program:
- Direct observations
- Audit and performance data
- Multi-source FB
- Simulation
- ITExam

Qual/Quant “Data” Synthesis: Committee

Milestones and EPAs as Guiding Framework and Blueprint

Unit of Analysis: Program

Accreditation

Certification and Credentialing

Unit of Analysis: Individual
Dreyfus & Dreyfus Development Model

- Novice
- Advanced Beginner
- Competent
- Proficient
- Expert/Master

Time, Practice, Experience

Dreyfus SE and Dreyfus HL. 1980
Carraccio CL et al. Acad Med 2008;83:761-7
The Milestones and NAS in a Nutshell

- A Continuous Accreditation Model based on assessment of annual data – this list is not all encompassing and is subject to change
  - Annual program data (resident/faculty information, major program changes, citation responses, program characteristics, scholarly activity, curriculum)
  - Aggregate board pass rate
  - Resident clinical experience
  - Resident survey and faculty survey (latter is new)
- **Semi-annual resident Milestone evaluations**
- 10 year Self-Study and Self-Study Visit
- Clinical Learning Environment Review (CLER) Visits
Dreyfus & Dreyfus Development Model

MILESTONES

<table>
<thead>
<tr>
<th>Novice</th>
<th>Advanced Beginner</th>
<th>Competent</th>
<th>Proficient</th>
<th>Expert/Master</th>
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<tbody>
<tr>
<td>Curriculum Assessment</td>
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Time, Practice, Experience

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Milestones

• By definition a milestone is a significant point in development.

• Milestones should enable the trainee and the program to know an individual’s trajectory of competency development.
Defining Competency Based Education

Defined outcome

Observable & Assessed

Defined outcome

Frank JR et al. Med Teach. 2010;32:631-7
## Emergency Medicine Milestone: Example

**PC1. Emergency Stabilization**

Prioritizes critical initial stabilization action and mobilizes hospital support services in the resuscitation of a critically ill or injured patient and reassesses after stabilizing intervention.

<table>
<thead>
<tr>
<th>Level 1</th>
<th>Level 2</th>
<th>Level 3</th>
<th>Level 4</th>
<th>Level 5</th>
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</thead>
<tbody>
<tr>
<td>Describes a primary assessment on a critically ill or injured patient</td>
<td>Recognizes when a patient is unstable requiring immediate intervention</td>
<td>Discerns relevant data to formulate a diagnostic impression and plan</td>
<td>Manages and prioritizes critically ill or injured patients</td>
<td>Develops policies and protocols for the management and/or transfer of critically ill or injured patients</td>
</tr>
<tr>
<td>Recognizes abnormal vital signs</td>
<td>Prioritizes vital initial stabilization actions in the resuscitation of a critically ill or injured patient</td>
<td>Reassesses after implementing a stabilizing intervention</td>
<td>Recognizes in a timely fashion when further clinical intervention is futile</td>
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<tr>
<td>Performs a primary assessment on a critically ill or injured patient</td>
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<td>Evaluates the validity of a DNR order</td>
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<td>Integrates hospital support services into a management strategy for a problematic stabilization situation</td>
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</tbody>
</table>

Comments:
Milestones as Roadmap

Observations:
1) Journey not a straight line
2) More than one path (but not infinite paths)
3) “If you don’t know where you are going, any road will get you there”
What Milestones Are Not:

- A complete description of:
  - Clinical Competence of any individual
  - The elements of competence in a specialty/subspecialty
  - Promotion Criteria
  - Graduation Criteria

- The totality of a discipline

- The sole determinants to be used in Competency Based Medical Education

- “Tools” to Close Programs
There is No Holy Grail…

CBME relies heavily on the judgments of humans.

The goal is to enhance the probability of making better judgments for the benefit of both patients and learners
Entrustment in GME

- As faculty, we “entrust” trainees to do many things without direct supervision
  - Admit patients to hospital from the ED
  - Night float
  - Clinic preceptor sign-out (without seeing the patient)
- What justifies these “entrustments”?
- How do we know when and if to make such entrustments?
Dyad Conversation

• What do you entrust your residents to do with only reactive (indirect) supervision?

• How do you decide?
Early Look at the Evidence
Evidence of “Learning”: Year 1

- PC Q1, EM, (n=162)
Residents Attaining Level 4 or Higher

Emergency Medicine

Proportion

PGY1  PGY2  PGY3  PGY4

PC  MK  SBP  PBLI  PROF  ICS

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Milestone Distributions by PGY

Average Scores Across All Items by Year N=5780

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Initial EM Validity Study

- Performed as anticipated
  - Higher scores associated with greater experience, including 4 year programs
- Reliability high across PG years
- Factor analysis demonstrates factors associated with topic and source and consistent with certification program

Milestone Journey: Revised Conceptual Model of Rapid Cycle Change

Thank You and Questions

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