Competency-based Medical Education
The Basics

William Iobst MD, FACP
Disclosures

- I work for the American Board of Internal Medicine.
- I am honored to be here, but I do regret the time away from family!
“In times of change, learners inherit the earth while the learned find themselves beautifully equipped to deal with a world that no longer exists.”

-Eric Hoffer
Agenda

- CBME basics
  - Definitions
- Frameworks and outcomes
  - Where we are/where we need to be
- The role of milestones and entrustment in the assessment and evaluation of competence
Learning Objectives

- Understand the basics of Competency-Based Medical Education (CBME)
- Understand the benefits of a clearly defined framework assessing competency-based training outcomes
  - Recognize the value of a milestones framework for defining outcomes of training
  - Identify Entrustable Professional Activity (EPA) and entrustment as a strategy for generating meaningful and manageable work-based assessments of performance
An observable ability of a health professional, integrating multiple components such as knowledge, skills, values and attitudes.

The International CBME Collaborators, 2009
Competent

Possessing the required abilities in all domains in a certain context at a defined stage of medical education or practice.

The International CBME Collaborators, 2009
Competence entails more than the possession of knowledge, skills and attitudes; it requires you to apply these [abilities] in the clinical environment to achieve optimal results.

ten Cate, Med Teach, 2010
What does competency-based medical education mean to you?
The Transition to Competency

Fixed length, variable outcome

- Knowledge acquisition
- Single subjective measure
- Norm referenced evaluation
- Evaluation setting removed
- Emphasis on summative

Variable length, defined outcome

- Knowledge application
- Multiple objective measures
- Criterion referenced
- Evaluation setting: DO
- Emphasis on formative

Competency Based Education

Caraccio et al 2002
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 International CMBE Collaborators 2009
The Framework

ACGME General Competencies

- Medical knowledge
- Patient care and procedural skills
- Interpersonal and communication skills
- Practice-based learning and improvement
- Systems-based practice
- Professionalism
What is the outcome and who determines it?

The Profession?
The Public?
Policy Makers?
The Profession?
- The “core” of medicine?
- Competence in the ACGME general competencies?
- Safe and effective patient care?

The Public?
- Trust that a doctor is competent to do what he or she does?

Policy Makers?
- Meeting the needs of the complex and aging population?
The Outcome

The IOM Outcome - High Quality Care

Timely - Reducing waits and harmful delays

Efficient - Avoiding waste

Equitable - Providing care that does not vary in quality because of personal characteristics

Safe - Avoiding injuries from care

Effective - Providing services based on scientific knowledge to all who could benefit; refraining from providing services to those not likely to benefit

Patient centered - Providing care that is respectful of and responsive to individual patient preferences, needs, and values

Crossing the Quality Chasm: A New Health System for the 21st Century 2001
Patient Centered Care

“A partnership among practitioners, patients, and their families (when appropriate) to ensure that decisions respect patient’s wants, needs, and preferences and that patients have the education and support they need to make decisions and participate in their own care”

IOM 2001
An Institutional Question?

Are trainees at Duke achieving the competency required for unsupervised practice that includes the delivery of safe, timely, equitable, effective and patient-centered care?
Hospital Comparisons on Quality and Resource Use (Higher scores represent better performance)

Non-teaching (N= 997)  Teaching (N=186)

Source: L. Binder, CEO of Leapfrog Group, email communication, March 2010
Individual Physician Readiness – The Gaps

Office-based Practice Competencies

• Inter-Professional team skills
• Clinical IT Meaningful Use skills
• Population management skills
• Reflective practice and CQI skills

- Care Coordination
- Continuity of Care
- Leadership and management skills
- Systems thinking
- Procedural Skills

Crosson Health Affairs 2011
Medical School to Residency – The Gaps

- Wide variability in graduating students’ clinical skills measured as MS4s or starting internship
  - History taking
  - Exam
  - Counseling/informed decision making

1. Stillman; Ann Intern Med; 1990
2. Sachdeva, Arch Surg; 1995
3. Lypson, Acad Med; 2004
5. Braddock, 1999
Calls for Reform in Medical Education

- Standardize learning outcomes
- Individualize learning while allowing flexibility and the opportunity to progress as learners achieve competency milestones
- Establish rigorous and progressively higher levels of competency across the continuum of medical education
- Develop a coherent framework for the continuum of medical education and establish effective mechanisms to coordinate standards

Physician Skills for the Next Generation

- Leadership training/Emotional intelligence
- Systems theory and analysis
- Cross disciplinary training/multi-disciplinary teams
- Understanding and respecting the skills of other practitioners
- Population health management/health policy and regulation
- Palliative care/end-of-life
- Resource management/medical economics
- Less “captain of the ship”/more member/leader of the team
- Empathy/customer service
- Time/conflict management
- Giving formative feedback
- Understanding cultural and economic diversity

American Hospital Association Task Force 2011
An Institutional Question?

Are trainees at Duke achieving the competency required for unsupervised practice that includes the delivery of safe, timely, equitable, effective and patient-centered care?

“So how do you know?”
CBME - A New Paradigm

You must specifically *know* the trainee has demonstrated expected competence:

- Requires clear definition of expected outcomes or competencies
  - (milestones)
- Requires assessment and evaluation systems capable of demonstrating that these things are done consistently and within the clinical environment
  - (work-based assessment using EPAs)
Milestones

The definition of expected outcomes
Milestones

- By definition a milestone is a significant point in development.
- Milestones should enable the trainee, program and the certification board to know an individual's trajectory of competency acquisition.
- The milestones define the floor of competence but do not eliminate the need for aspirational goals!
Milestones and Trajectories

Lucey and Boote
NAS Accreditation Milestones

- Will serve as one of nine sets of data that ACGME will use when accrediting programs
- Will allow ACGME to track the development of desired competence at the program level
- Milestones reporting will occur twice per year and will begin in 2013
ACGME Milestones 2013

- Diagnostic Radiology
- Emergency Medicine
- Internal Medicine
- Neurological Surgery
- Orthopedic Surgery
- Pediatrics
- Urological Surgery
ACGME Accreditation Internal Medicine Milestones

- Narratives describing the development of competence in each of the six ACGME general competencies
- Define stages of development (informed by assessment data) that provide the framework for making judgment/attestation of competence
- 22 narrative milestones streams
# Internal Medicine Milestones

Version 12/2012

## 5. Requests and provides consultative care. (PC5)

<table>
<thead>
<tr>
<th>Critical Deficiencies</th>
<th>Ready for unsupervised practice</th>
<th>Aspirational</th>
</tr>
</thead>
<tbody>
<tr>
<td>Is unresponsive to questions or concerns of others when acting as a consultant or utilizing consultant services.</td>
<td>Provides consultation services for patients with clinical problems requiring basic risk assessment.</td>
<td>Switches between the role of consultant and primary physician with ease.</td>
</tr>
<tr>
<td>Unwilling to utilize consultant services when appropriate for patient care.</td>
<td>Asks meaningful clinical questions that guide the input of consultants.</td>
<td>Provides consultation services for patients with basic and complex clinical problems requiring detailed risk assessment.</td>
</tr>
<tr>
<td>Inconsistently manages patients as a consultant to other physicians/health care teams.</td>
<td>Appropriately weighs recommendations from consultants in order to effectively manage patient care.</td>
<td>Manages discordant recommendations from multiple consultants.</td>
</tr>
<tr>
<td>Inconsistently applies risk assessment principles to patients while acting as a consultant</td>
<td></td>
<td></td>
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<tr>
<td>Inconsistently formulates a clinical question for a consultant to address.</td>
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</tbody>
</table>

Comments:

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**Patient Care**

The resident is demonstrating satisfactory development of the knowledge, skill, and attitudes/behaviors needed to advance in training. He/she is demonstrating a learning trajectory that anticipates the achievement of competency for unsupervised practice that includes the delivery of safe, timely, equitable, effective and patient-centered care.

[ ] Yes  [ ] No  [ ] Marginal
Emergency Medicine Milestones

5. Pharmacotherapy (PCS)

Selects and prescribes, appropriate pharmaceutical agents based upon relevant considerations such as mechanism of action, intended effect, financial considerations, possible adverse effects, patient preferences, allergies, potential drug-food and drug-drug interactions, institutional policies, and clinical guidelines; and effectively combines agents and monitors and intervenes in the advent of adverse effects in the ED

<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>Knows the different classifications of pharmacologic agents and their mechanism of action.</td>
<td>Applies medical knowledge for selection of appropriate agent for therapeutic intervention</td>
<td>Considers array of drug therapy for treatment. Selects appropriate agent based on mechanism of action, intended effect, and anticipates potential adverse side effects</td>
<td>Selects the appropriate agent based on mechanism of action, intended effect, possible adverse effects, patient preferences, allergies, potential drug-food and drug-drug interactions, financial considerations, institutional policies, and clinical guidelines, including patient’s age, weight, and other modifying factors</td>
<td>Participates in developing institutional policies on pharmacy and therapeutics</td>
</tr>
<tr>
<td>Consistently asks patients for drug allergies</td>
<td>Considers potential adverse effects of pharmacotherapy</td>
<td>Considers and recognizes potential drug to drug interactions</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Comments:

Suggested Evaluation Methods: SDOT, portfolio, simulation, oral boards, global ratings, medical knowledge examinations
# Neurosurgery Milestones

## Vascular Neurosurgery – Patient Care

<table>
<thead>
<tr>
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<th>Level 4</th>
<th>Level 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Performs a history and physical examination in patients with ischemic</td>
<td>Explains risks and benefits of surgery and endovascular therapy for</td>
<td>Formulates a work-up and treatment plan for patients with aneurysms,</td>
<td>Independently formulates a treatment plan for patients with comorbidities</td>
<td>Systematically reviews treatment outcomes for neurovascular disease</td>
</tr>
<tr>
<td>or hemorrhagic stroke</td>
<td>aneurysms, vascular malformations, and ischemic stroke</td>
<td>vascular malformations, or ischemic stroke</td>
<td>or other complicating factors (e.g., previous stroke, coronary artery</td>
<td>Participates in quality improvement for neurovascular disease</td>
</tr>
<tr>
<td>Provides routine perioperative care for patients undergoing extracranial</td>
<td>Interprets CT, MR, and angiographic studies</td>
<td>Independently performs routine components of procedures (e.g.,</td>
<td>disease, anti-coagulation)</td>
<td>Independently performs advanced procedures</td>
</tr>
<tr>
<td>and intracranial vascular surgery</td>
<td>Assists with routine components of procedures (e.g., pterional</td>
<td>Performs complex procedures with assistance (e.g., carotid</td>
<td>Independently performs complex procedures</td>
<td></td>
</tr>
<tr>
<td>Initiates the work-up of a patient with ischemic or hemorrhagic stroke</td>
<td>craniotomy, diagnostic catheter angiography)</td>
<td>endarterectomy, aneurysm clipping, arteriovenous malformation resection</td>
<td>Performs advanced procedures with assistance (e.g., aneurysm coiling,</td>
<td></td>
</tr>
<tr>
<td>Explains risks and benefits of diagnostic catheter angiography</td>
<td>Recognizes and initiates work-up of complications after surgery or</td>
<td>Manages complications with assistance</td>
<td>vascular malformation embolization, extracranial-intracranial bypass</td>
<td></td>
</tr>
<tr>
<td></td>
<td>endovascular therapy (e.g., hemorrhage, ischemic stroke, cardiovascular</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>compromise</td>
<td></td>
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</tbody>
</table>

**Comments:** Not yet rotated ☐
Narratives and Judgments

- Pangaro (1999) – matching students to a “synthetic” descriptive framework (RIME) reliable and valid across multiple clerkships
- Regehr (2007) – Matching students to a standardized set of holistic, realistic vignettes improved discrimination of student performance
- Regehr (2012) – Faculty created narrative “profiles” (16 in all) found to produce consistent rankings of excellent, competent and problematic performance.
Assessment/Evaluation Challenges

- Ensure that assessment and evaluation document competence in those activities that are important –
  - that define the profession and that meet desired training outcomes!

The M&M principal
The M & M Principle

Meaningful and Manageable
Entrustable Professional Activities

- EPAs represent the routine professional-life activities of physicians based on their specialty and subspecialty.

- The concept of “entrustable” means:
  - “a practitioner has demonstrated the necessary knowledge, skills and attitudes to be trusted to independently perform this activity.”

An Entrustable Professional Activity

- Part of essential work for a qualified professional
- Requires specific knowledge, skill, attitude
- Acquired through training
- Leads to recognized output
- Observable and measureable, leading to a conclusion
- Reflects the competencies expected

- EPA’s together constitute the core of the profession

ten Cate et al.
**Acad Med** 2007
Let's watch a video.

What has this resident been entrusted to do? If this were your institution, are you confident that you can attest to the resident’s competence?
How are these entrustments taught, assessed and evaluated at Duke?

Informed consent
Procedural competency
Teamwork
Breaking bad news
“Entrustment in Medical Education”

- Focused assessments around what faculty and training programs already “entrust” trainees to do
  - Reflects the most important outcome of training: a trainee’s readiness to bear *professional* responsibility
  - Reflect a developmental process of entrustment across the continuum that ultimately demonstrates competency in an EPA
    - Appropriate entrustment across the continuum (think Dreyfus!)
Dreyfus and Dreyfus Model

Dreyfus SE and Dreyfus HL. A 1980
Carraccio CL et al. Acad Med 2008;83:761-7
Progression Varies by Trainee/Context

Novice
Advanced Beginner
Competent
Proficient
Fellow
PGY2
PGY3
PGY4
MS3
MS4
Fellow
Expert/Master

Time, Practice, Experience

Dreyfus SE and Dreyfus HL. A 1980
Carraccio CL et al. Acad Med 2008;83:761-7
What is Needed by the Patient

Dreyfus SE and Dreyfus HL. A 1980
Carraccio CL et al. Acad Med 2008;83:761-7
The Outcome of High Quality Care

- Importance of appropriate supervision
- Entrustment

Trainee performance* X Appropriate level of supervision**

Must = Safe, effective patient-centered care

* a function of level of competence in context
** a function of attending competence in context

Kogan, Iobst and Holmboe
Entrustment - A Foot In Two Worlds

Developmental Learning

Safe and Effective Care

Kogan
Putting it Together
Assessment (competent vs. not competent)

Curriculum (K/S/A) → Entrustments And EPAs → Milestones → Next Accreditation System

How Milestones…

... can be used by faculty to assess resident competence …

... and allow programs…

... to report outcomes via the NAS.

Clinical Competency Committee

Attesting to (competence)
“Wisdom of the Crowd”

- Hemmer (2001) – Group conversations more likely to uncover deficiencies in professionalism
- Schwind, Acad. Med. (2004) – 18% of resident deficiencies requiring active remediation only became apparent through group discussion.
  - Average discussion 5 minutes/resident (range 1 – 30 minutes)
- Thomas (2011) – Group assessment improved inter-rater reliability and reduced range restriction in multiple domains in an internal medicine residency
## Competencies, Milestones and EPAs

![Venn Diagram showing the overlap of Competencies, Milestones, and EPAs]

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Competencies</th>
<th>Milestones</th>
<th>EPAs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Granularity</td>
<td>Low</td>
<td>Moderate to High</td>
<td>Low to Moderate</td>
</tr>
<tr>
<td>Synthetic/Integrated</td>
<td>Moderate</td>
<td>Low to Moderate</td>
<td>High</td>
</tr>
<tr>
<td>Practicality (application)</td>
<td>Low</td>
<td>Moderate</td>
<td>High</td>
</tr>
<tr>
<td>Conceptual</td>
<td>High</td>
<td>Low</td>
<td>Low to Moderate</td>
</tr>
</tbody>
</table>
The “System”

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

Judgment and Synthesis: Committee

Institution and Program

Accreditation: ACGME/RRC

Program Aggregation

NAS Milestones
ABIM Fastrak

No Aggregation

Certification: ABIM

Curricular Milestone and EPAs as Guiding Framework and Blueprint

Residents

Faculty, PDs and others
Thank You