Competency-Based Medical Education: Understanding the Principles

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Goals of this webinar...

- To lay the foundation for future sessions in this series;
- To outline reasons why we need to change our current education system, and how CBME may address these;
- To define competency-based medical education (CBME) and common terms that are used when discussing it;
- To enumerate the 5 components of CBME;
- To describe models for implementing CBME across the continuum of medical education.
Where this webinar fits....

- The Rising Tide of Competency-based Medical Education: A Global View  (Jason Frank 2017)

Main messages:
- History of CBME
- Current status of health professions education
- Definition of CBME terms
- Principles of CBME
Where this webinar fits....

- The Rising Tide of Competency-Based Medical Education: A Global View
- **Competency-Based Medical Education: Understanding the Principles**
- Generating Trust in Entrustment: an update from the AAMC Core EPA Pilot Group
- Integration, competence and expertise: Preparing learners for the future
- Continuity, LICs and Competency-based Education
- Competency based education across the UME-GME continuum: the EPAC program
- ...

...
Something to think about ...

When does your kid get to drive the car?

- **Competency**
  - Can accelerate and brake smoothly
  - Can approach an intersection and can turn left

- **Competent**
  - Completes driver’s education classes
  - Passes driver’s license exam

- **Competence**
  - Drives safely on highway or during bad weather
  - Avoids accidents, no traffic tickets
‘Competenglish’

**Competency** – the thing(s) they need to do

**Competent** – can do all of the things

**Competence** – does all of the things consistently, adapting to contextual and situational needs
In contrast ....When do medical students or residents ‘get the keys to the car’?

- Lots of good assessments ...
- Completes set number of rotations of fixed duration
- Absence of bad assessments ...
- Survives prescribed years of training...
- Passes the exams

- The program director or unit chair follows the rules...
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Challenges and changes in today’s medicine

**Profession**
- Quality & safety
- Explosion of knowledge
- New technologies
- Scant resources
- Workload
- Teamwork
- Maintaining competence
- Responsibility to society

**Patient & public**
- Quality & safety
- Access to care
- Compassion
- Communication skills
- Ethics
- Professionalism

How can we as medical educators prepare physicians to be effective in this environment?
Outcomes: Competence drops over time

Once in, good for life.

Acceptable performance

Changing standards

Certification

Time

Performance
Competency Gaps

- Office-based Practice Competencies: skills in...
  - Working in inter-professional teams
  - Clinical IT
  - Population management
  - Reflective practice
  - CQI

- Care Coordination
- Continuity of Care
- Leadership & management
- Systems thinking
- Procedural Skills

Crosson, Health Affairs 2011
Models of undergraduate medical education

- 4 year ‘graduate entry’ or 5-7 year ‘direct entry’
  - Pre-clinical → Clinical
- Preclinical – classroom and laboratory
  - Large classes, didactic, written exams
- Clinical ‘rotations’
  - In large academic teaching hospitals
  - Role: observer
  - Written exams, knowledge-based

This is changing ...

PBL, longitudinal clerkships, technology, flipped class ...
Current models of residency education

- Apprenticeship – ‘work-based learning’
- Assigned to a ‘rotation’ for a period of time
- Supervised care of patients with ‘graduated responsibility’
- +/- a formal curriculum
- ‘Core competencies’
- Assessment and advancement based on performance and time spent
- Exit examination: written, clinical
Medical Education ‘Architecture’

Preclinical
Basic Sci

Medical School
Third Year Clerkship Example

Internal Medicine
Surgery  Ob/Gyn  Psych  Peds  Other

Post-Graduate Training
Residency Year Example

Weekly half-day ambulatory clinic

Daily-type Transitions

“On Call”  Handoff  Post-call  Handoff  Night Float  Handoff  Clinic

Holmboe E, Ginsburg S, Bernabeo E. Med Educ. 2011
The ‘magic’ in medical education

Dwell Time

“I Think You Should Be More Explicit Here In Step Two.”
Challenges of Modern Medical Education

- Based on time, not ability - length of training fixed
  - ‘Service vs education’
  - Heterogeneity of experiences
  - Irrelevant or missing content

The “Tea Steeping Model” of Medical Education
Challenges of Modern Medical Education

- Based on time, not ability - length of training fixed
  - ‘Service vs education’
  - Heterogeneity of experiences
  - Irrelevant or missing content
- Trainees unprepared at many stages & for transitions
- Variable work-based assessment / failure to fail
  - Little direct observation
  - Depend on high stakes exams
- Preparation for practice?
  - Lifelong practice enhancement
Challenges of Modern Medical Education

- Faculty: overload, burden
  - Teacher-learner relationship affected
  - Need to assess for (not of) learning
- Few resources
- Education inefficiency
  - Inflexible
- Concerns about patient harm
- Not based on patient needs
- Not meeting society’s needs
Response to critiques of medical education

The Similarity and Frequency of Proposals to Reform US Medical Education

Constant Concerns

Nicholas A. Christakis, MD, PhD, MPH
After the Flexner Report ...

MEDICAL EDUCATION SEEMS TO BE IN A PERPETUAL STATE OF UNREST. From the early 1900s to the present, more than a score of reports from foundations, educational bodies, and professional task forces have criticized medical education for emphasizing scientific knowledge over biologic understanding, clinical reasoning, practical skill, and the development of character, compassion, and integrity. How did this situation arise, and what can be done about it? In this article, which introduces a new series on medical education in the Journal, we summarize the changes in medical education over the past century and describe the current challenges, using as a framework the key goals of professional education: to transmit knowledge, to impart skills, and to inculcate the values of the profession.
After the Flexner Report

- “The need for a fundamental redesign of the content of medical training is clear”
- “facts and concepts are best recalled and put into service when they are taught, practiced, and assessed in the context in which they will be used”
- “our approaches to the evaluation of learners must reach beyond knowledge to rigorously assess procedural skills, judgment, and commitment to patients”
After the Flexner Report

- “for training in skills to be effective, learners at all levels must have the opportunity to compare their performance with a standard and to practice until an acceptable level of proficiency is attained”

- “An ... honest admission that neophytes cannot perform high stakes procedures at an acceptable level of proficiency demand that we develop approaches to skills training that do not put our patients at risk in service to education”
We need doctors who ...

- Are optimally prepared for practice
- Can safely provide complex care
- Can work and lead health care teams
- Maintain / improve their competence in changing contexts
- Possess skills and abilities beyond knowledge
  - knowing $\rightarrow$ doing $\rightarrow$ being
We need medical education that ...

- Is based on explicit outcomes needed by graduates
  - Transparent to learners, teachers, assessors
- Focuses on individual learner needs
- Ensures physician competence increases over time
- Teaches for competence, aims for excellence
- Promotes life-long learning
- Provides ‘right’ amount of time
- Provides public accountability
Competency-based Medical Education

“We believe that in the future, expertise rather than experience will underlie competency-based practice and...certification.”

Aggarwal & Darzi, NEJM 2006
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Competency-based medical education

An outcomes-based approach to the design, implementation, assessment, and evaluation of medical education programs, using an organizing framework of competencies*  

*derived from an analysis of societal and patient needs  

1. Frank, Snell et al, Med Teacher 2010  
2. Frank et al, Med Teacher 2010
Fundamental concepts of CBME

- Education must be based on the health needs of the populations served.

- Primary focus of education & training should be desired outcomes for learners rather than structure and process of the system.

- The formation of a physician should be integrated across the continuum – UGME → PGME → practice.

CBME principles

1. Focus on outcomes: graduate abilities
2. Ensure progression of competence
3. Time is a resource, not framework
4. Promote learner centeredness
5. Greater transparency & utility
Competency Defined:

An observable *ability* of a health professional related to a specific activity that integrates knowledge, skills, values, and attitudes.

A specific area of performance that can be described and measured

- Competencies are observable, and can be measured and assessed to ensure their acquisition.
- Competencies can be assembled like building blocks to facilitate progressive development.

Competence Defined:

The array of abilities (knowledge, skills, behaviors and attitudes) across multiple domains or aspects of performance in a certain context.

- require descriptive qualifiers to define the relevant abilities, context, stage of training.
- multi-dimensional and dynamic
- changes with time, experience, and setting.

Describes a global, general impression of the adequacy to practice independently.
Milestones and EPAs

Milestone:
A defined, observable marker of an *individual’s ability* along a developmental continuum that expresses the stepwise progression of expertise\(^1\); ‘significant point in development’\(^2\)

e.g. Respond to patients’ non-verbal communication; use appropriate non-verbal behaviours to enhance communication with patients

Entrustable Professional Activity (EPA):
A key *task of a discipline* (profession, specialty, or sub-specialty) that an individual can be trusted to perform without direct supervision in a given health care context, once sufficient competence has been demonstrated\(^1\)

e.g. conduct significant conversations with patients and other providers

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1. Englander, Frank, Snell et al, Med Teacher 2017
2. Holmboe and Hamstra, ACGME
Milestones and EPAs

Milestone:
- More detailed than competencies
- Clear descriptions, explicit statements
- Expected level of ability
- Observable - link to feedback

Entrustable Professional Activity (EPA):
- Links competency to clinical context
- Reflects a collection of different competencies as applied to the work of the discipline
Issues Milestones Address

1. Progression of Competence
2. Authentic Assessment
3. Comprehensive Curriculum
4. Faculty guidance
5. Learner transparency
6. Failure to fail
**Entrustment** defined

In the context of clinical training:

Being given full autonomy to carry out a professional task unsupervised.

The goal of medical education is readiness for unsupervised practice; the outcome of assessment in the workplace be measured in terms of the level of supervision to be provided.
Linking EPAs and milestones

Assessing unstable patients, providing targeted treatment and consulting as needed
- Recognize medical instability
- Address primary priorities of resuscitation (ABCs)
- Perform a focused clinical assessment
- Develop a specific differential diagnosis
- Develop and implement preliminary treatment strategies
- Identify the necessity and urgency of consultation for advanced care
- Document clinical encounters to adequately convey clinical reasoning and the rationale for decisions
- Communicate with the receiving physicians or health care professionals during transitions in care
Caution!

- There are different conceptual approaches to EPAs and milestones in different parts of the world.

- See Englander, Frank, Snell et al, *Medical Teacher* 2017 for a discussion
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Van Melle’s Core Components of CBME

1. Competencies required for practice are clearly articulated.
2. Competencies are arranged progressively.
3. Learning experiences facilitate the progressive development of competencies.
4. Teaching practices promote the progressive development of competencies.
5. Assessment practices support and document the progressive development of competencies.
1. Competencies required for practice are clearly articulated.

**Domain of competence** defined:

Broad, distinguishable areas of competence that in the aggregate constitute a general descriptive framework for a profession.

Outcomes of training based on societal needs.
2. Competencies are arranged progressively.

- Progressive sequencing of competencies
- EPAs and Milestones (developmental markers) facilitate this
- Some competencies form building blocks for further development of competence
Figure 2. Spectrum of skills acquisition (Dreyfus & Dreyfus 1980).

Figure 3. General curve of skills acquisition reproduced from ten Cate (2010).
3. Learning experiences facilitate the progressive development of competencies.

- Experiences are sequenced to support development of ability,
- Flexible to allow individual variation: time is a resource, not a driver,
- Learning experiences should resemble practice environment and tied to an ability needed by graduate (Immersion)
- Allow active learning, with application of knowledge
- Allow deliberate practice, coaching and feedback
4. Teaching practices promote the progressive development of competencies.

<table>
<thead>
<tr>
<th>Preclinical / Extra-clinical</th>
<th>Clinical</th>
</tr>
</thead>
<tbody>
<tr>
<td>Problem- and case-based</td>
<td>Learning through experience and application</td>
</tr>
<tr>
<td>Early clinical exposure</td>
<td>Direct observation &amp; feedback, coaching</td>
</tr>
<tr>
<td>Active learning, groups</td>
<td>‘Boot camps’</td>
</tr>
<tr>
<td>Flipped classrooms</td>
<td>Advanced simulation methods</td>
</tr>
<tr>
<td>‘Learning objectives’ replaced by milestones, EPAs or outcomes</td>
<td>Learner involved in determining learning needs</td>
</tr>
<tr>
<td>Fewer lectures</td>
<td>Responds to individual needs</td>
</tr>
</tbody>
</table>
5. Assessment practices support and document progressive development of competencies.

- ‘Real world’ work-based assessment - outcomes related to the learner’s ability to function in practice
- Mapped or blueprinted to competencies: fixed standard
- Includes ongoing, timely, meaningful feedback
- Continuous, comprehensive assessment, with multiple points and methods
- Summative assessment ‘programmatic’ – decision-making system to collate
Why work-based assessment

It is only in the "does" triangle that the doctor truly performs.
Importance of an Assessment Program

Caverzagie and lobst “Windows to Competence”
Van Melle’s Core Components of CBME

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E van Melle in press
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‘One World’... Competency Frameworks

- UK Good Doctor
- CanMEDS Holland
- Saudi CanMEDS
- Japan Competencies
- Australia - CanMEDS
- CanMEDS Chile
- ACGME
Common competencies within the frameworks

- (Clinical) expertise
- Problem solving
- Health advocacy / prevention
- Communication skills
- Teamwork / collaboration
- Leadership and management
- Teaching skills
- Life-long learning
- Critical appraisal
- Professionalism
Global Examples

- Australia
- Canada
- Kuwait
- Netherlands
- Saudi Arabia
- Singapore
- South Africa
- USA
- ... and others
Example at the undergraduate level:

*Cleveland Clinic Lerner College of Medicine*

- 9 broad competencies: (medical knowledge, research, clinical skills, reasoning, communication, professionalism, systems, personal development, reflective practice)

In first 2 years:

- Basic science learning objectives integrated with outcomes in core clinical disciplines
- Learning strategies - PBL, longitudinal clinical experiences, integrative seminars, clinical skills sessions
- Goal of assessment is to enhance learning
- Tools: CAPP, SAQ – feedback → gaps
Example at the postgraduate level: 

*RCPSC Competence by Design*

- A multi-phase project designed to improve residency education, including the exam process, the accreditation system, and continuing professional practice.

- Competency-based initiative is transforming medical education, and changing physician performance expectations.

- Uses CanMEDS framework

- National, all specialties, all programs
Stages of competence

- **Traditional stages**
  - Practising physician
  - Senior resident
  - Junior resident

- **Proposed CBD stages**
  - Transition to discipline
  - Foundations of discipline
  - Core of discipline
  - Transition to practice
  - Continuing professional development (maintenance of competence and enhanced expertise)
  - Transition out of professional practice

- **Medical education phases**
  - MD
  - Royal College Examination
  - Certification
  - Learning in practice
  - Discipline-specific residency

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1 Competence by Design (CBD)

2 Milestones at each stage describe terminal competencies

September 2014
<table>
<thead>
<tr>
<th>Stage</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transition to Discipline</td>
<td>Emphasizes the orientation and assessment of new trainees arriving from different medical schools and programs (including outside Canada).</td>
</tr>
<tr>
<td>Foundation</td>
<td>Covers broad-based competencies that every trainee must acquire before moving on to more advanced, discipline-specific competencies.</td>
</tr>
<tr>
<td>Core</td>
<td>Includes the core competencies that make up the majority of a discipline.</td>
</tr>
<tr>
<td>Transition to Practice</td>
<td>The senior trainee should demonstrate readiness to make the transition to autonomous practice.</td>
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</tbody>
</table>
Progression of Competence
- Uses milestones and EPAs to sequence learning experiences

- Work-based formative assessment: observation, feedback, coaching

- Summative assessment: e-portfolio to collect
What we have talked about...

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CBME

Competencies needed for practice

Curriculum

Teaching

Learning experiences

Progression, sequencing

Assessment

Multiple, formative: ass’t for learning

Programmatic assessment

Learning

Progression of competencies

Learning outcomes via milestones & EPAs

Authentic experiences

Individualized