Competency-Based Education:
the Journey in Medicine

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Conflicts of Interest

- No financial conflicts of interest

- Faculty in International Course on Ins & Outs of Entrustable Professional Activities
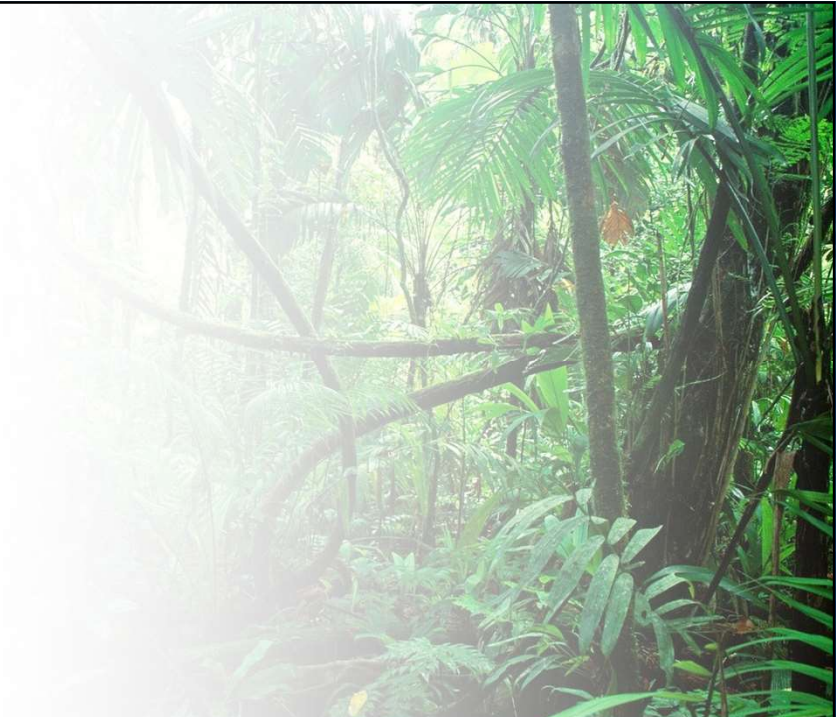
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Objectives

- Describe Medicine's journey with CBE

- Compare the two main approaches or frameworks for defining outcomes in CBE

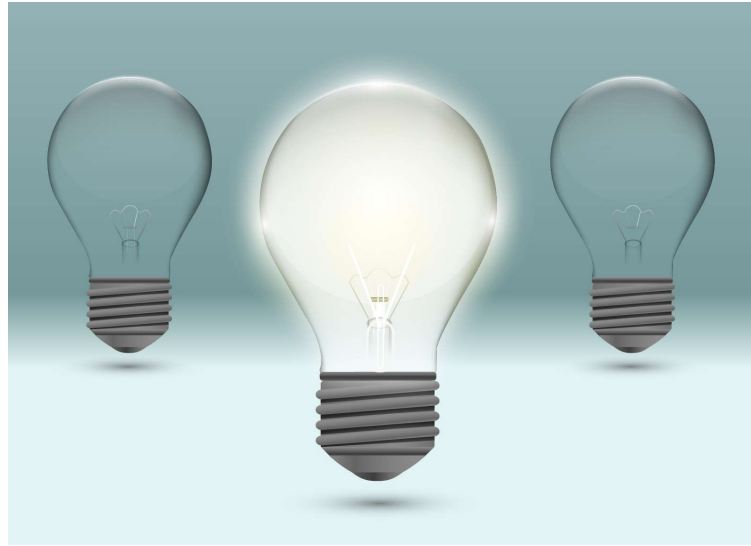- Describe the five core components of CBE

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**No Common
CBE Framework
for UME/GME
or Among UME**

**Multiple
Approaches**

**CBME:
Not a New Concept**

• WHO 1978

• Medicine revival
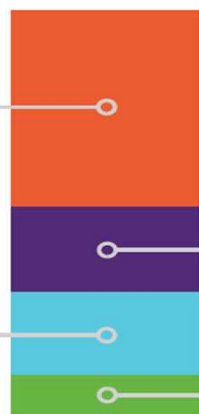in 1990s/2000s

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TO ERR IS HUMAN FRAMED PATIENT SAFETY AS A SERIOUS PUBLIC HEALTH ISSUE (1999 ESTIMATES)

44,000 – 98,000
Annual deaths from medical error among hospitalized patients.[a]

43,458
Annual deaths from car crashes.

42,297
Annual deaths from breast cancer.[a]

16,516
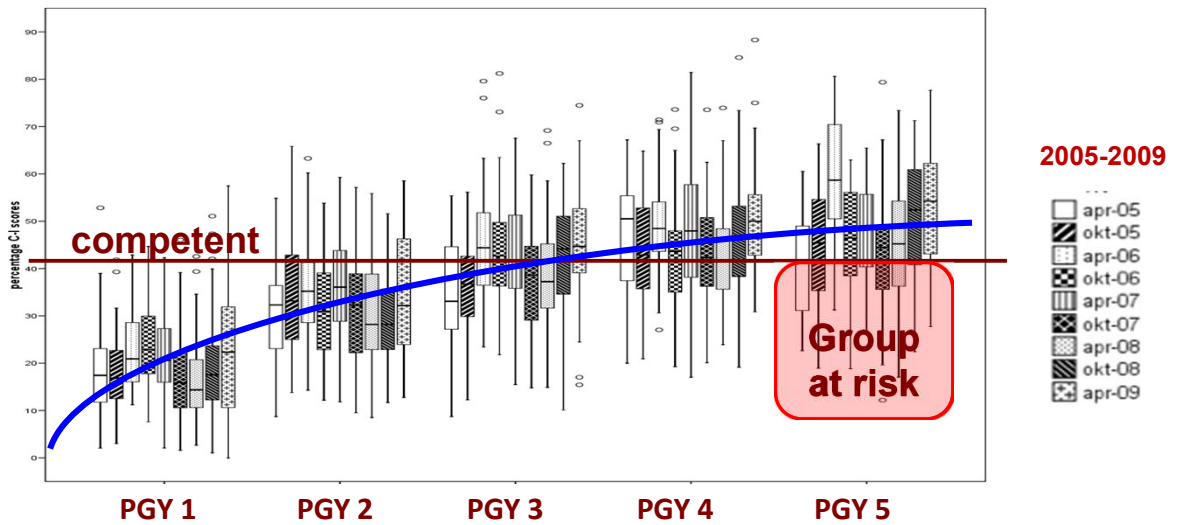Annual deaths from AIDS.[a]

Evidence that some graduates not prepared for safe effective practice

Kohn et al., To Err is Human: Building a Safer Health System 2000

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Dutch Radiology Residents Progress Test Scores

Ravesloot et al., *Medical Teacher* 2012
Graphic from ten Cate

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Unacceptable Variability in Graduates

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Focusing on Outcomes vs Process?

Learning (outcome) versus Teaching (process)

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Competency-Based Education: Definition in Medicine

"An approach to preparing physicians for practice that is fundamentally oriented to graduate outcome abilities and organized around competencies derived from an analysis of societal and patient needs. It de-emphasizes time-based training and promises greater accountability, flexibility, and learner-centeredness"

An outcomes-based approach to the design, implementation, assessment, and evaluation of education programs

Frank et al., *Medical Education* 2010

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Essence of CBE

- Goal of safer and higher quality care

- Critical features:
  – Clear description of desired outcomes and standards (good health professional)
  – Assessment of all learners using these standards
  – Achievement of outcomes/ standards is basis for graduation

- Time is resource, not proxy for competence
  – Competence is **assessed**, not **assumed**
  – Practitioners licensed only when standards met

Adapted from Touchie 2018 and ten Cate 2020

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Operationalizing CBE

Examples from Medicine

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Curricular Models

Traditional

Curriculum → Educational Objectives → Assessment

CBE

Health Needs System Needs → Outcomes → Curriculum / Assessment
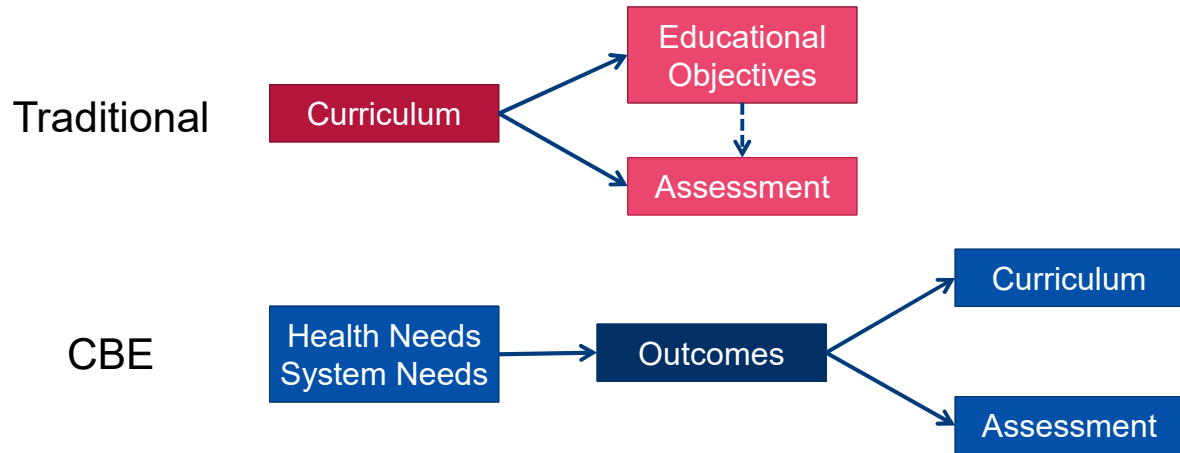
Frenk et al., *Lancet* 2010

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Step 1:

Defining

Outcomes

the journey doesn't start at the beginning, it begins at the end.
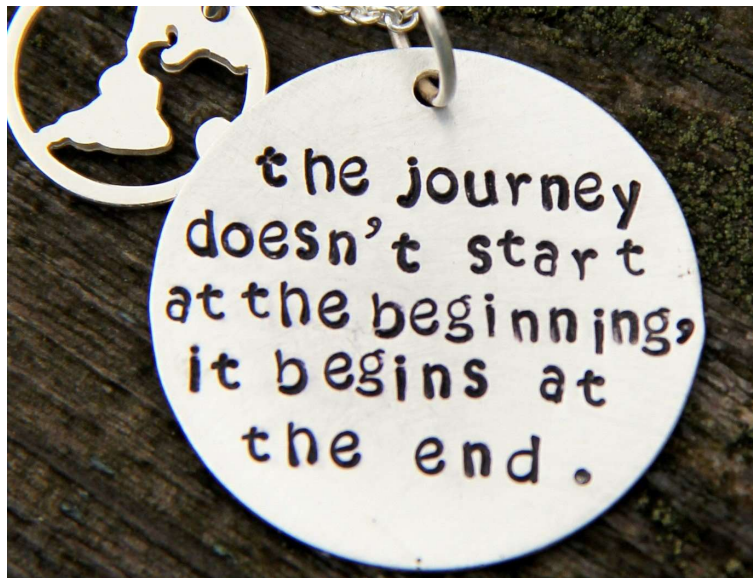
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ACGME Outcome project
enhancing residency education through outcomes assessment

- Patient care
- Medical knowledge
- Practice based learning & improvement
- Interpersonal and communication skills
- Professionalism
- Systems-based practice

CanMEDS: Professional, Communicator, Scholar, Medical Expert, Collaborator, Health Advocate, Leader
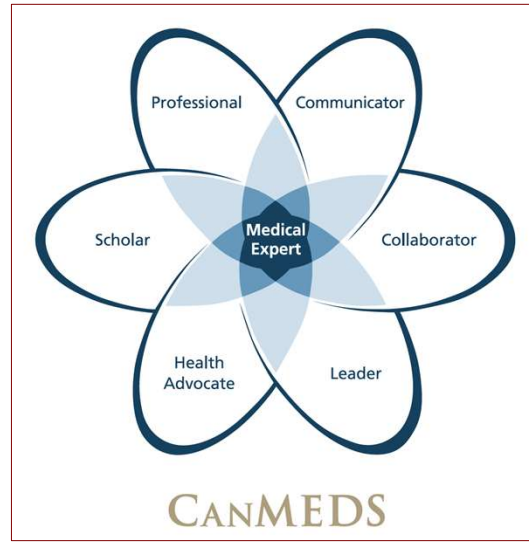
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Professional Practice

Comp Domain Ex. Patient Care
- C_2 — M_1 M_2
- C_3 — M_1 M_2

Comp Domain Ex. Medical Know
- C_1 — M_1 M_2
- C_4 — M_1 M_2

Comp Domain Ex. Professionalism
- C_2 — M_1 M_2
- C_5 — M_1 M_2
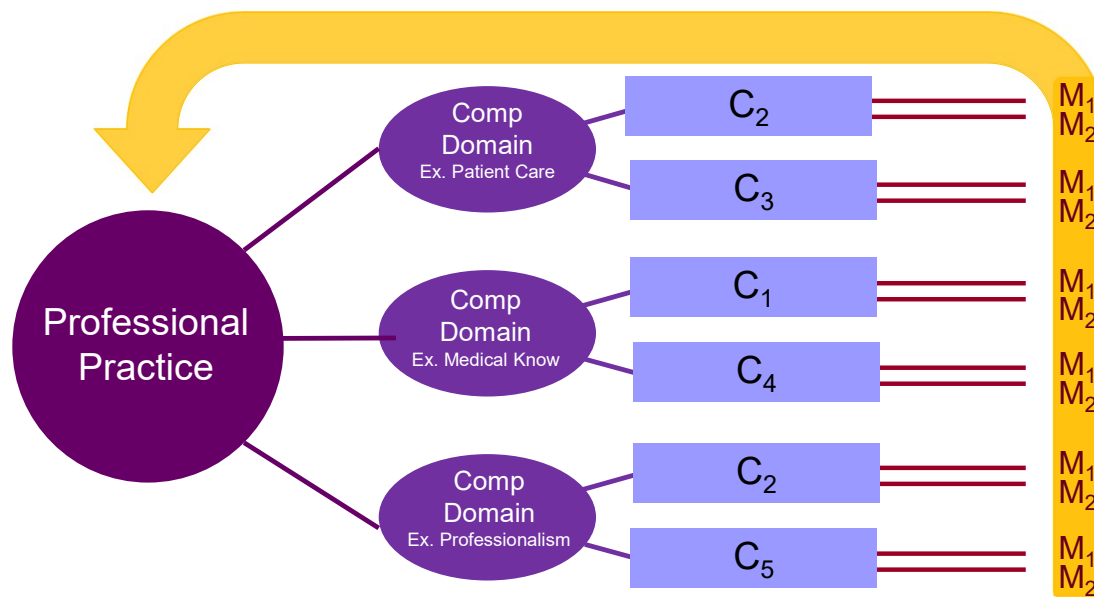
Adapted from AAMC 2014

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Concern for Reductionism

- Everything reduced to checklist of competencies
  - Don't add up to practice
  - Don't ensure integration & application

- Focus on objective assessments
  - Measuring what is easy vs relevant
  - Assume capabilities are context free

Holmboe et al., *Medical Teacher* 2017

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Most Common Competency Approach

- Define competencies
  - Knows traffic rules
  - Can accelerate and brake smoothly
  - Can make right, left, and u-turns

- Ensure competent drivers
  - Pass driver's education classes
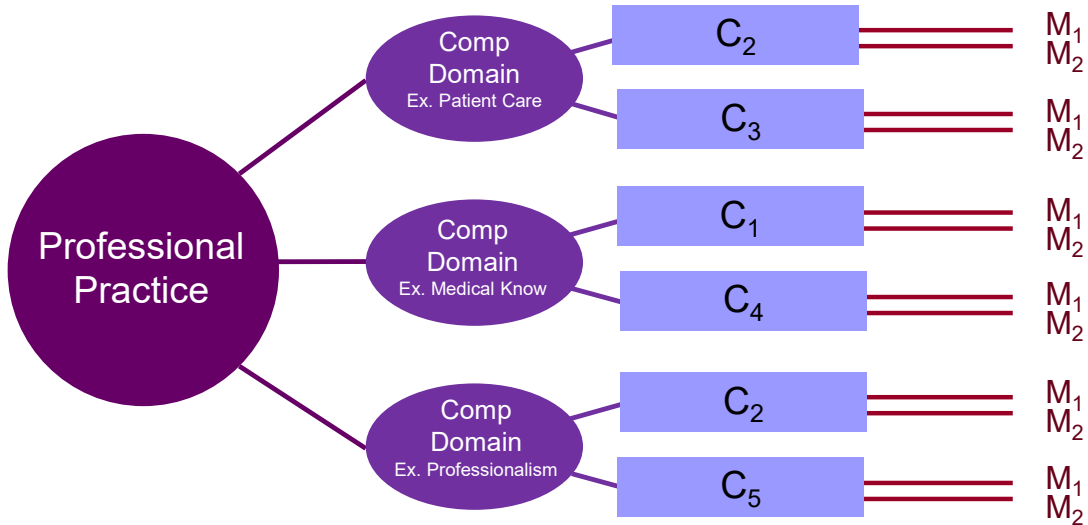 - Pass driver's license test (written + driving)

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Determining Competence

Can be trusted to drive carefully and safely

Passed driver's license exams

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Professional Practice
    ├── Comp Domain (Ex. Patient Care)
    │     ├── C₂ ═══ M₁ M₂
    │     └── C₃ ═══ M₁ M₂
    ├── Comp Domain (Ex. Medical Know)
    │     ├── C₁ ═══ M₁ M₂
    │     └── C₄ ═══ M₁ M₂
    └── Comp Domain (Ex. Professionalism)
          ├── C₂ ═══ M₁ M₂
          └── C₅ ═══ M₁ M₂
```

Professional Practice

Comp Domain Ex. Patient Care
- C_2 — M_1 M_2
- C_3 — M_1 M_2

Comp Domain Ex. Medical Know
- C_1 — M_1 M_2
- C_4 — M_1 M_2

Comp Domain Ex. Professionalism
- C_2 — M_1 M_2
- C_5 — M_1 M_2

Adapted from AAMC 2014
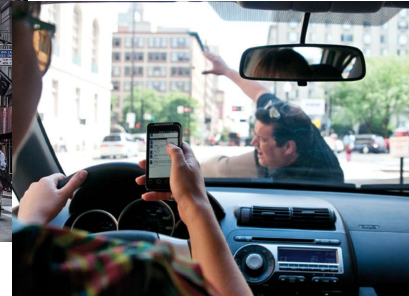
Focusing on the Whole

Professional Practice

- Whole of practice

- Required integration & application of competencies to patient care

- Patient care as the outcome

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Outcomes as Patient Care Activities

Entrustable Professional Activities (EPAs) are units of professional practice that can be entrusted to a sufficiently competent learner or professional

- Essential concrete clinical activities

- Allow deliberate decisions of "entrustment"

- Portfolio of mastered EPAs = full competence

ten Cate et al., *Medical Teacher* 2015

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Example EPAs from Graduate Medical Education

- Manage care of patients with chronic disease (internal medicine)

- Manage high risk childbirth (obstetrics & gynecology)

- Manage psychiatric emergencies (psychiatry)

- Manage a non-OR patient with chronic pain (anesthesia)

- Care for a well newborn (pediatrics)

AAIM 2012; Garofalo et al. *Cureus* 2018; Young et al. *Academic Medicine* 2018; Woodworth et al. *Anesthesia & Analgesia* 2021; ABP 2013

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Sample AAMC Core EPAs

- Gather history & perform physical examination
- Prioritize differential diagnosis following clinical encounter
- Recommend and interpret common diagnostic/ screening tests
- Enter & discuss orders/ prescriptions
- Document clinical encounter in patient record
- Provide oral presentation of clinical encounter
- Give/ receive patient handover

AAMC 2014

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Key Elements of an EPA Approach

1. Holistic approach to competencies

2. Links entrustment & supervision to assessment

3. Highlights consequences of assessment

Entrustment/Supervision as Assessment

Shall I trust this learner to…

- Aligns with supervision decisions faculty already make every day

- Results in meaningful advancement in learner responsibility

EPA Entrustment-Supervision Scale

Original (GME) Entrustment Scale	
1	Not allowed to practice EPA
2	Allowed to practice under proactive full supervision
3	Allowed to practice under reactive supervision
4	Allowed to practice EPA unsupervised
5	Allowed to supervise others in practice of EPA

ten Cate et al., *Medical Teacher* 2010

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EPA Entrustment-Supervision Scale

	Original Scale	Expanded Scale
1	Not allowed to practice EPA	1a. Not allowed to observe 1b. Allowed to observe
2	Allowed to practice under proactive full supervision	2a. As coactivity with supervisor 2b. With supervisor in room ready to step in as needed
3	Allowed to practice under reactive supervision	3a. With supervisor immediately available, all findings/decisions double checked 3b. With supervisor immediately available, key findings/decisions double checked 3c. With supervisor distantly available, findings/decisions reviewed
4	Allowed to practice unsupervised	4a. With supervisor available on call to come provide supervision 4b. With supervisor not available but may provide feedback and monitoring in hindsight
5	Allowed to supervise others	

Chen et al., *Academic Medicine* 2015; ten Cate et al., *Medical Teacher* 2018

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Five Factors Influencing Readiness for Entrustment

Capability   knowledge, skills, experience, situational awareness

Reliability   conscientious, predictable, accountable, responsible

Integrity   truthful, benevolent, patient-centered

Humility   recognizes limits, asks for help, receptive to feedback

Agency   proactive toward work, team, safety, personal development

Weighing these factors makes for A RICH entrustment decision

ten Cate & Chen, *Medical Teacher* 2020

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Flexibility of EPAs

- Core EPAs
- Selective or elective EPAs
  - Learner interest
  - Program strengths
- Dynamic profile of EPAs
  - As EPAs earned during training
  - As EPAs added after training
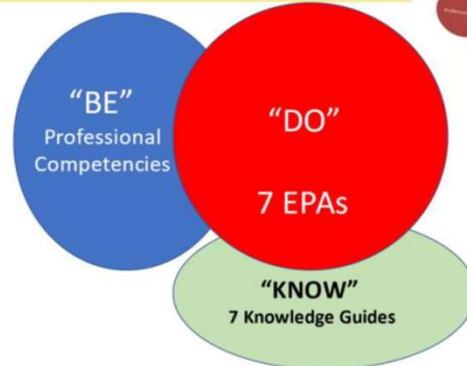 - As EPAs expire

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Two Main Approaches

Professional Work to be Done

Competencies of Person doing Work

Adapted from ten Cate

Physical Therapy

APTA — American Physical Therapy Association

APTA Academy of Education — A Component of the American Physical Therapy Association

AMERICAN COUNCIL OF ACADEMIC PHYSICAL THERAPY

fsbpt

ABPTS — American Board of Physical Therapy Specialties

CAPTE — Commission on Accreditation in Physical Therapy Education

ABPTRFE — American Board of Physical Therapy Residency & Fellowship Education

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Ireland National Internship Curriculum

Operationalizing CBE

Additional Steps

What are the Ingredients of CBE?

1. Outcome competencies

2. Sequenced progression

3. Tailored learning experiences

4. Competency-focused instruction

5. Program of assessment

Van Melle et al., *Academic Medicine* 2019
Image from Freepik.com designed by macrovector

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1. Outcome Competencies

Component	What it looks like in practice	How it works in principle
Competencies required for practice are *clearly articulated*	Required outcome competencies based on profile of graduate and/or practice-based abilities	Specification of learning outcomes promotes focus and accountability

Van Melle et al., *Academic Medicine* 2019

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Considerations

- Need to hold ourselves accountable to the outcomes

- Think about what needs to change to support achievement of outcomes
  - Curriculum
  - Assessment

- Do more than map what we are already doing to the outcomes

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2. Sequenced Progression

Component	What it looks like in practice	How it works in principle
Competencies and their developmental markers are *sequenced progressively*	Competencies are organized in a way that leads to a logical developmental sequence across the continuum of training or practice	A sequential path supports the development of expertise

Van Melle et al., *Academic Medicine* 2019

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3. Tailored Learning Experiences

Component	What it looks like in practice	How it works in principle
Learning experiences *facilitate* the developmental acquisition of competencies	Learning takes place in settings that model practice, is flexible enough to accommodate variation in individual learner needs, and is self-directed	Learning through real life experiences facilitates membership into the practice community and development of competencies

Van Melle et al., *Academic Medicine* 2019

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Curricular Design

- Consider where
  - Competency introduced
  - Opportunities provided for practice and feedback (with assessment for learning)
  - Opportunities to demonstrate competence

- Ideally spiral curriculum
  - Introduction of basic building blocks
  - Reinforcement with increasing complexity

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4. Competency-based Instruction

Component	What it looks like in practice	How it works in principle
Teaching practices *promote* the developmental acquisition of competencies	Teaching is individualized to the learner, based on abilities required to progress to the next stage of learning	Development of competence is stimulated when learners are supported to learn at their own pace and stage

Van Melle et al., *Academic Medicine* 2019

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Learner Centeredness

- Learners with different backgrounds, needs, learning trajectories

- Allow tailored curriculum vs set curriculum
    - Dutch GME training
    - Dutch final UME year

- Allow time variable achievement
    - AAMC CBE pilot (Education in Pediatrics Across the Continuum - EPAC)
    - Queens University GME programs with variable final year
    - U of Wisconsin-Milwaukee Flexible RN to BSN

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5. Program of Assessment

Component	What it looks like in practice	How it works in principle
Assessment practices *support and document* the developmental acquisition of competencies	Learner progression is based on a systematic approach to decision making including standards, data collection, interpretation, observations and feedback	Programmatic assessment systems allow for valid and reliable decision making

Van Melle et al., *Academic Medicine* 2019

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Demonstration of Competence

- Assess for synthesis of knowledge, skills, attitudes into observable competencies vs just knowledge or skills

- Multiple opportunities across multiple contexts and with multiple evaluators

- Standards should be criterion-based

- Assessments should not be compensatory

- Evidence for (picture of) competence across multiple assessments

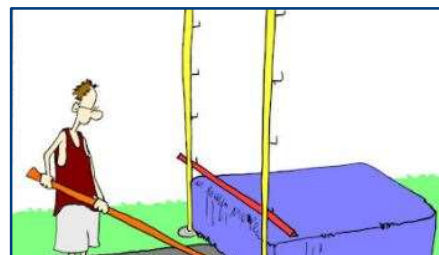Frank et al., *Medical Teacher* 2010

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Five Core Components of CBE at Work
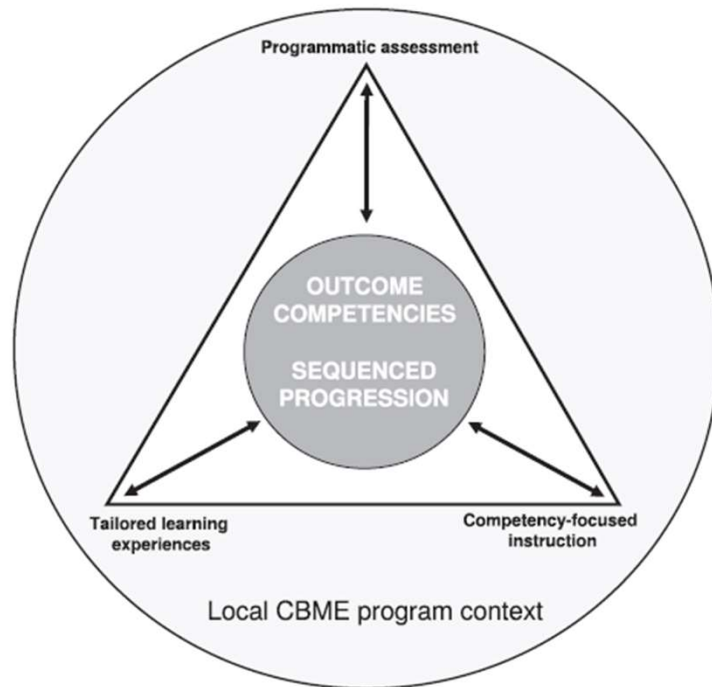
Criticisms of CBE

1. Philosophical / ideologic concern
    – Fails to promote excellence
    – Same problems as current training

2. Lack of evidence

3. Impact on existing systems

4. Implementation challenges

5. Reductionism

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What Are We Trying to Achieve?

- Adopt a competency framework for health professions education training programs?

- Implement frameworks or tools for competency assessment?

- Graduate learners who meet standards at the time of graduation or licensing?

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What Are We Trying to Achieve?

Deliver practitioners who are capable of

– coping with

– providing safe quality care in the context of

unpredictable requirements of practice

at any time during practice

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Thank You

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