



# Start at the End:

## How to choose the right competencies to assess

Health Professions Educator Conference  
Tom Gearan, MD



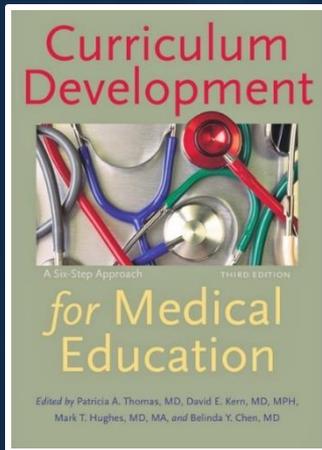
# Objectives

- Apply elements of Kern's six steps of curriculum development into your own curriculum design and competency evaluation of your learners.
- Apply the five Core Components of Van Melle et al's framework for CBME to your own curriculum project.

# Disclosures

- None of the speakers for this educational activity have relevant financial relationship(s) to disclose with ineligible companies whose primary business is producing, marketing, selling, re-selling, or distributing healthcare products used by or on patients.

# Resources



Patricia A. Thomas, David E. Kern, Mark T. Hughes, Belinda Y. Chen. *Curriculum Development for Medical Education: A Six-Step Approach*. Vol Third edition. Johns Hopkins University Press; 2016.

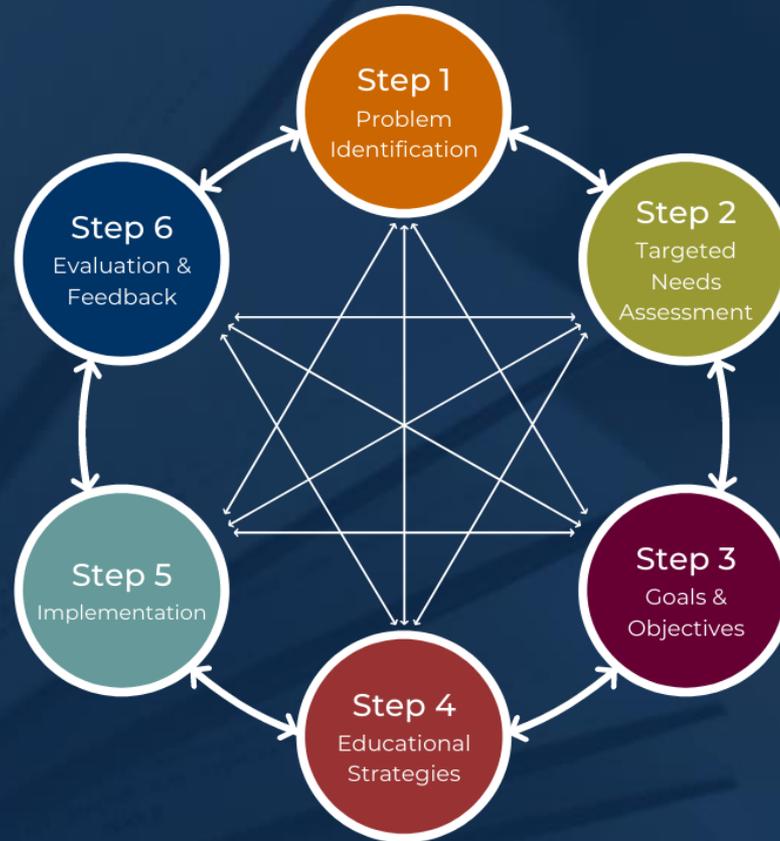
Research Report

## **A Core Components Framework for Evaluating Implementation of Competency-Based Medical Education Programs**

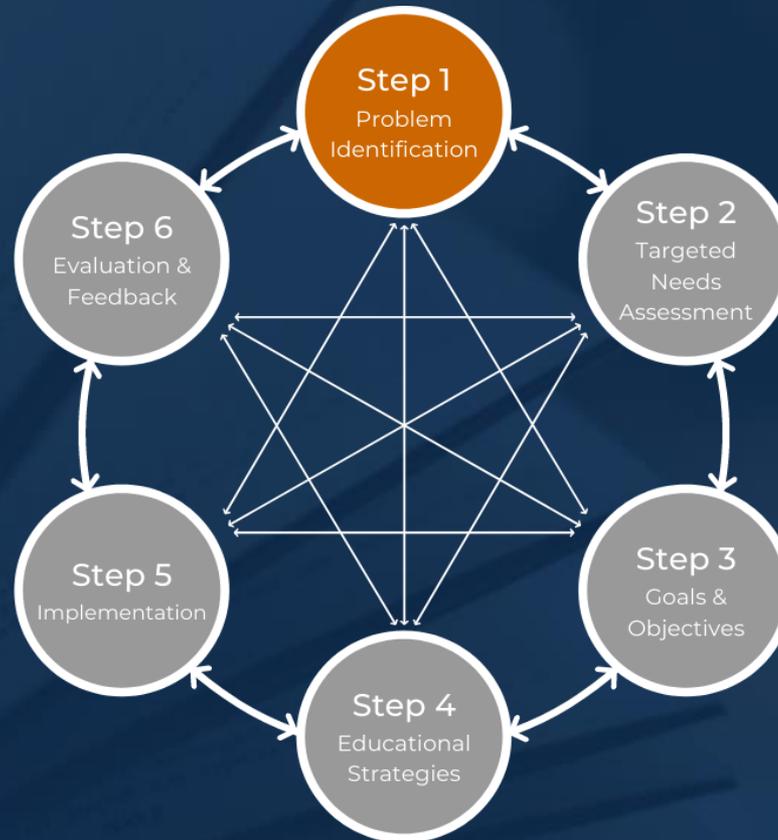
Elaine Van Melle, PhD, Jason R. Frank, MD, MA(Ed), Eric S. Holmboe, MD, Damon Dagnone, MD, MSc, MMEd, Denise Stockley, PhD, and Jonathan Sherbino, MD, MEd, on behalf of the International Competency-based Medical Education Collaborators

Van Melle et al, *Academic Medicine*, vol 94, No. 7, pg 1002, July 2019

# Kern's Six-Step Model



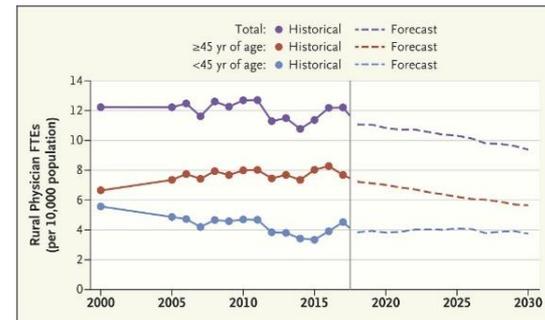
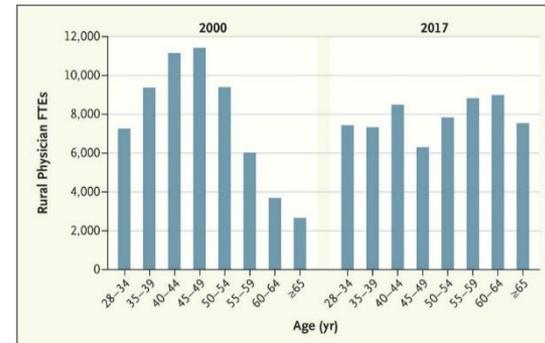
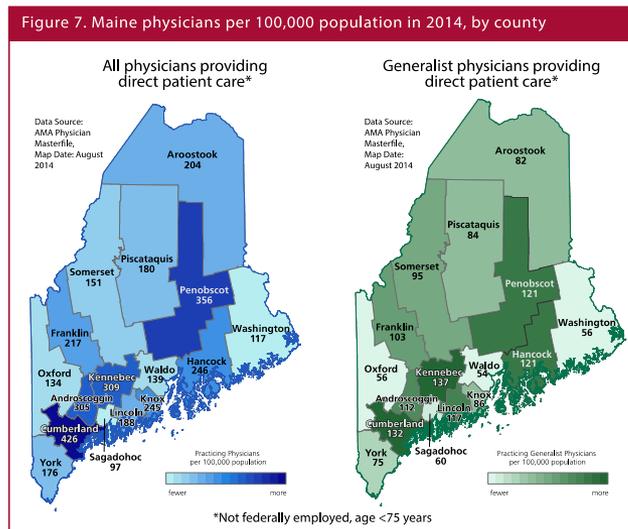
# Step 1 | Problem Identification



# The Problem: Rural Physician Workforce

- Maine:** a 2014 physician workforce study showed a shortage of generalist physicians existed in Maine's rural counties. These rural counties also had a higher percentage of physicians age 55 or older.
- National:** the national rural physician workforce is shrinking and aging

Figure 7. Maine physicians per 100,000 population in 2014, by county



“Implications of an Aging Rural Physician Workforce”  
 Skinner et al.  
 NEJM July 25<sup>th</sup>, 2019 (381:299-301)

# The Context: Calls for Innovation in GME

- ACGME and Institute of Medicine have challenged GME **to better serve the needs of their communities.**
- AAMC: “**align residency training positions with societal needs and student aspirations**”
- Within internal medicine, ACP and SGIM called for the **redesign of training to produce more general internists** practicing in ambulatory settings.

ACGME Self-Study (<http://www.acgme.org/What-We-Do/Accreditation/Self-Study>)

IOM Report: Graduate Medical Education That Meets the Nation's Health Needs

AAMC Report: Optimizing Graduate Medical Education 2015

SGIM Health Policy Committee JGIM. 2014;29(11)1546-1551

# Step 1 | **Problem Identification**

Identifying and clarifying the problem you are aiming to address. A clearly defined problem will benefit your formation of goals and objectives.

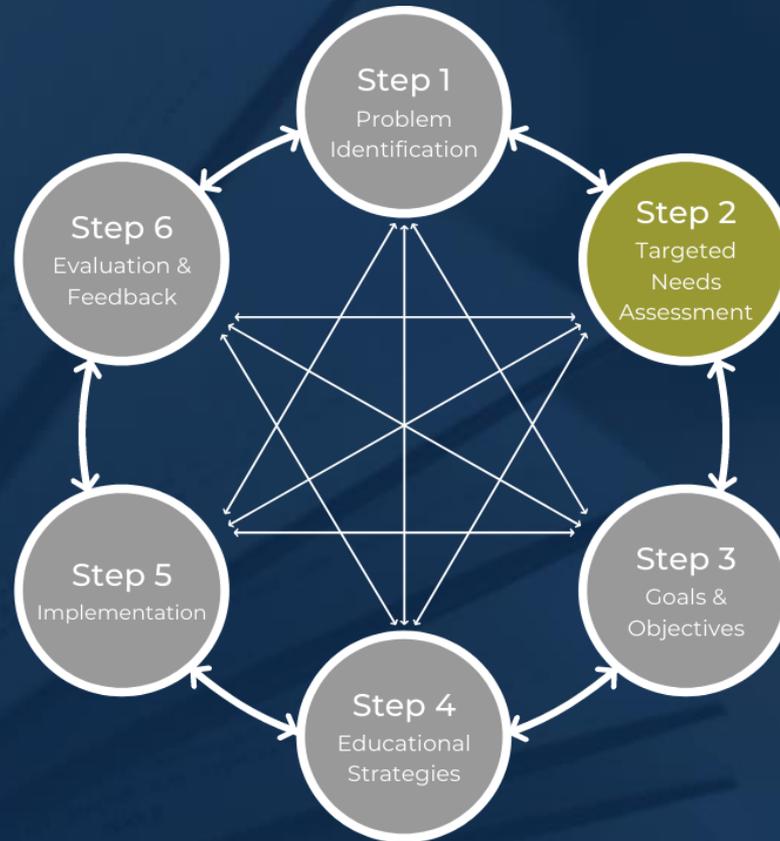
-who does the problem effect?

-what does it effect for these people?

# The Problem

- A shortage of physicians existed in rural Maine counties, threatening access to care and exacerbating health disparities for Maine's rural communities.
- This problem was projected to get worse due to an aging rural physician workforce.
- MMC (and therefore Maine) was not producing enough IM graduates entering rural primary care practice:
  - MMC IM graduates entering outpatient practice (2009-2018): 19%
  - MMC IM graduates practicing in a rural county (2009-2018): 6%

# Step 2 | Targeted Needs Assessment



## Step 2 | **Targeted Needs Assessment**

Defining the difference between the current and ideal characteristics of learners and their environment.

# Rural Training: Ideal State

- Rural medical education experiences promote rural practice:
  - The strongest predictor of eventual rural practice is significant rural exposure, particularly rural upbringing and rural medical education experiences.
    - » *“There is a linear gradient between increasing levels of rural exposure in FM GME and subsequent rural work”* –Russell et al, JGME 2022
  - Rural-focused curricula, or “tracks”, existed in many U.S. medical schools (35) and family medicine residencies (85)

Parlier et al, Acad Med. 2018;93:130-140

Rural Training Track Collaborative [rttcollaborative.net](http://rttcollaborative.net)

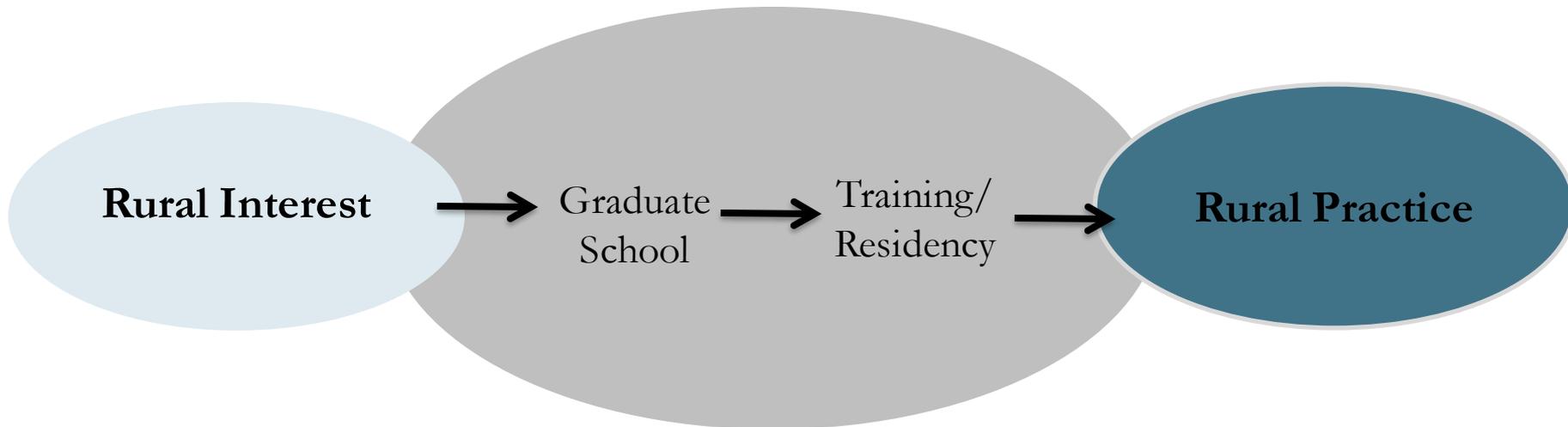
Blanchard et al, Acad Med 2016;91:1416-1422

Russell et al, Journal of GME, August 2022, 441-450

# Rural Training: Current State (pre-2017)

- Rural medical education experiences are very uncommon in IM training:
  - Location of IM residency programs in the United States:
    - » Urban 99%
    - » Rural 1%
  - No rural training tracks existed within IM residency programs in U.S. as of 2017
  - Out of 36 total months of training, MMC IM residents spent 1 month in a rural setting

# The Road to Rural Practice



# IM Training: Structures Yield Results

Rural Interest

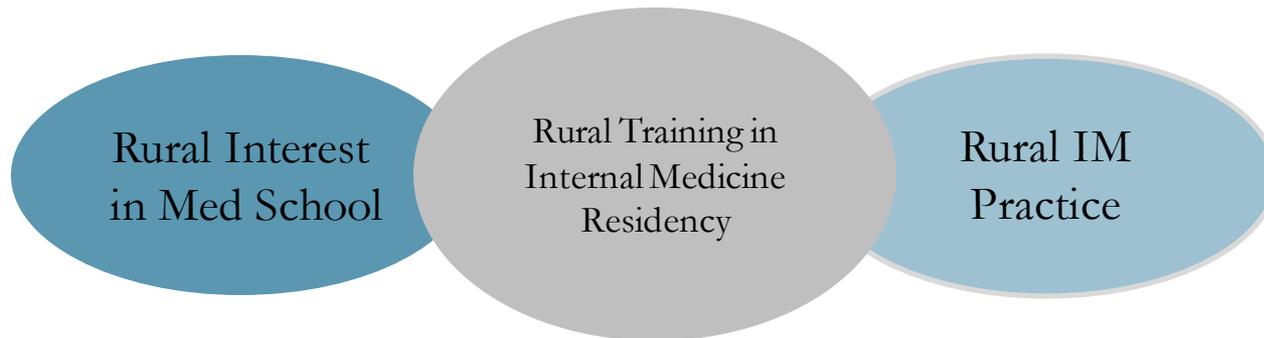
Classic Internal Medicine Training  
Urban setting  
Urban patient population  
Inpatient > outpatient setting  
Specialist-rich environment  
Education-rich environment  
Procedure experience variable  
Limited “community” experiences

Urban Practice  
Hospital Medicine  
Medical Specialties

A “confidence gap”  
for rural practice  
develops

# Our Targeted Needs Assessment

- Goal: strengthen Maine's rural GME training to better connect “rural interest” to rural general internal medicine practice.

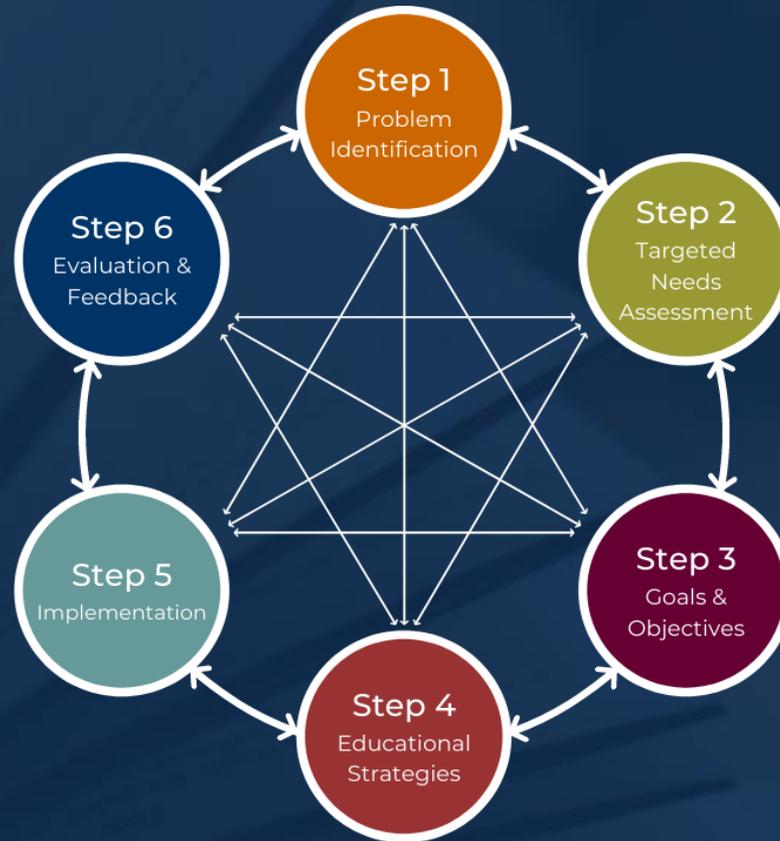


- Better understand what rural practice means today:
  - What does a rural (Maine) community need from an internal medicine physician?
  - What unique competencies are required of a rural physician?
- Redesign our residency program to better promote careers in rural IM:
  - What does a trainee need during internal medicine residency to competently and confidently enter rural practice?

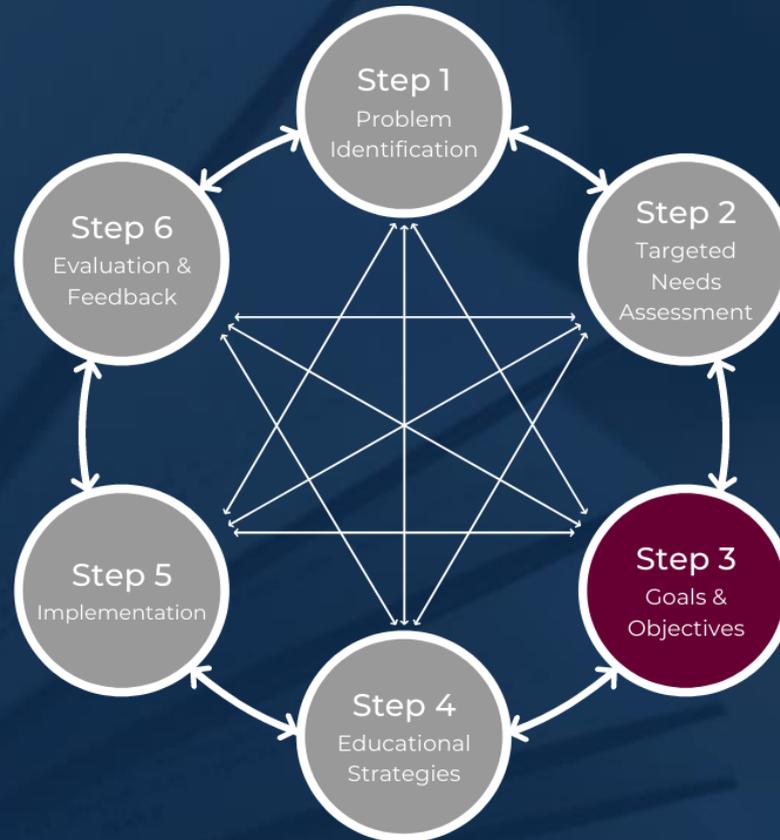
# Activity #1

- Share a current education project that you are working on or thinking about, including:
  - The problem you have identified
  - The results of any targeted needs assessments (current state vs ideal state) done thus far

# Kern's Six-Step Model



# Step 3 | Goals & Objectives

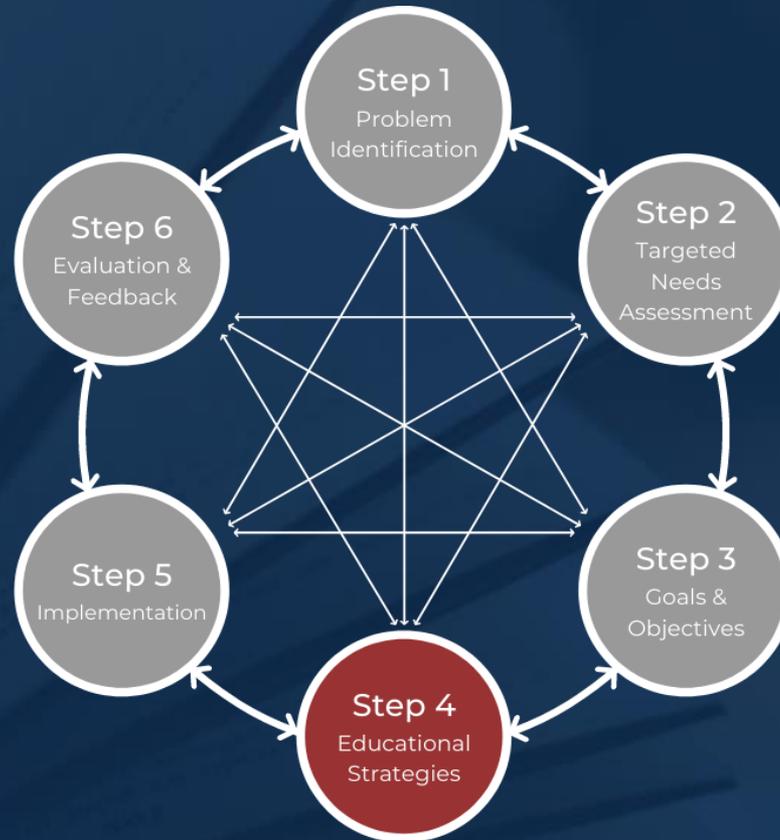


## Step 3 | Goals & Objectives

Goals are broad educational directives. Think big purpose of the curriculum. Objectives are specific educational directives that can be measured.

- Directs your choice of content, assignments and learning methods
- Let's you know how to evaluate your curriculum
- Provides stakeholders a clear idea of what curriculum will achieve

# Step 4 | Educational Strategies



## Step 4 | **Educational Strategies**

Once your goals and objectives are determined, you're ready to develop and design your educational strategies through your content and methods.

## A Core Components Framework for Evaluating Implementation of Competency-Based Medical Education Programs

Elaine Van Melle, PhD, Jason R. Frank, MD, MA(Ed), Eric S. Holmboe, MD, Damon Dagnone, MD, MSc, MEd, Denise Stockley, PhD, and Jonathan Sherbino, MD, MEd, on behalf of the International Competency-based Medical Education Collaborators

### Abstract

#### Purpose

The rapid adoption of competency-based medical education (CBME) provides an unprecedented opportunity to study implementation. Examining “fidelity of implementation”—that is, whether CBME is being implemented as intended—is hampered, however, by the lack of a common framework. This article details the development of such a framework.

#### Method

A two-step method was used. First, a perspective indicating how CBME is intended to bring about change was described. Accordingly, core components were identified. Drawing from the literature, the core components were

organized into a draft framework. Using a modified Delphi approach, the second step examined consensus amongst an international group of experts in CBME.

#### Results

Two different viewpoints describing how a CBME program can bring about change were found: production and reform. Because the reform model was most consistent with the characterization of CBME as a transformative innovation, this perspective was used to create a draft framework. Following the Delphi process, five core components of CBME curricula were identified: outcome competencies, sequenced progression, tailored learning experiences, competency-focused instruction, and

programmatic assessment. With some modification in wording, consensus emerged amongst the panel of international experts.

#### Conclusions

Typically, implementation evaluation relies on the creation of a specific checklist of practices. Given the ongoing evolution and complexity of CBME, this work, however, focused on identifying core components. Consistent with recent developments in program evaluation, where implementation is described as a developmental trajectory toward fidelity, identifying core components is presented as a fundamental first step toward gaining a more sophisticated understanding of implementation.

Competency-based medical education (CBME) is rapidly being adopted across the globe.<sup>1</sup> Consequently, educators and program leaders are in an unprecedented position to study implementation and evaluate outcomes of innovative curricula. However, these studies are hampered by the lack of a common description of what constitutes a CBME program. A similar situation faced problem-based learning (PBL) three decades ago when the absence of a standard description contributed to a series of inconsistent and inconclusive arguments regarding the impact of PBL.<sup>2-4</sup> The purpose of this article is to

describe a common framework that will permit reaching a deeper understanding of CBME programs, the influence of context, and the conditions under which they can work most effectively.<sup>5</sup>

#### The Importance of Evaluating CBME Program Implementation

Implementation evaluation is a specific form of program evaluation that examines the question “Is the program operating as intended?”<sup>6</sup> It allows researchers to open the “black box” of program functioning.<sup>7</sup> Without this information, the risk is present of producing a Type III error—that is, attributing negative findings to a failure in program theory when negative findings may actually reflect an error in program implementation.<sup>8</sup>

For example, a 2013 study concluded that produce graduates who are better prepared for medical practice,<sup>9</sup> thereby challenging a key assumption underlying CBME. The implementation

of CBME that was studied, however, was described as devoting 15% of curriculum time to competency development without any significant changes to teaching or learning. In contrast, the landmark description of CBME states, “Implementation of such a system demands substantial redefinition of faculty and student roles and responsibilities.”<sup>10(p51)</sup> Consequently, it is questionable as to whether this study actually examined a CBME curriculum.

Avoiding a Type III error is the most common reason cited for undertaking implementation evaluation. Other reasons include documenting deviations from, and differences in, implementation; allowing for more meaningful comparisons of interventions; and promoting external validity by providing adequate guidelines for implementation.<sup>11</sup> Implementation evaluation allows researchers and educators to provide evidence if what occurred in the program can be reasonably connected to outcomes.<sup>6</sup> Asking questions about the connection between CBME program

Please see the end of this article for information about the authors.

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Supplemental digital content for this article is available at <http://links.lww.com/ACADMED/A670>.

“Competency-based medical education is 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.”<sup>14</sup>

CORE COMPONENTS				
<b>OUTCOME COMPETENCIES:</b> Competencies required for practice are <i>clearly articulated</i> .	<b>SEQUENCED PROGRESSIVELY:</b> Competencies and their developmental markers are <i>sequenced progressively</i> .	<b>TAILORED LEARNING EXPERIENCES:</b> Learning experiences <i>facilitate</i> the developmental acquisition of competencies.	<b>COMPETENCY-FOCUSED INSTRUCTION:</b> Teaching practices <i>promote</i> the developmental acquisition of competencies.	<b>PROGRAMMATIC ASSESSMENT:</b> Assessment practices <i>support &amp; document</i> the developmental acquisition of competencies.
PRACTICE: What the core component should look like in practice				
Required outcome competencies are based on a profile of graduate and/or practice-based abilities.	Competencies are organized in a way that leads to a logical developmental sequence across the continuum of medical education or practice.	Learning takes in settings that model practice, is flexible enough to accommodate variation in individual learner needs & is self-directed.	Teaching is individualized to the learner, based on abilities required to progress to the next stage of learning.	Learner progression is based on a systematic approach to decision-making including standards, data collection, interpretation, observation & feedback.
PRINCIPLE: How the core component is supposed to work in practice				
Specification of learning outcomes promotes focus and accountability.	A sequential path supports the development of expertise.	Learning through real life experiences facilitates membership into the practice community & development of competencies.	Development of competence is stimulated when learners are supported to learn at their own pace and stage.	Programmatic assessment systems allow for valid and reliable decision making.
CONCEPTUAL FRAMEWORKS: Why the core component should work according to theories, models, or best practices				
<ul style="list-style-type: none"> <li>• Social accountability</li> <li>• Outcome-based education</li> <li>• Backwards design</li> <li>• Job task analysis</li> </ul>	<ul style="list-style-type: none"> <li>• Expertise theory</li> <li>• Entrustable professional activities</li> <li>• Surface &amp; deep approaches to learning</li> <li>• Mastery learning</li> </ul>	<ul style="list-style-type: none"> <li>• Situated learning</li> <li>• Deliberate practice</li> <li>• Self-regulated learning</li> <li>• Workplace-based learning</li> <li>• Professional identity formation</li> </ul>	<ul style="list-style-type: none"> <li>• Zone of proximal development</li> <li>• Constructive friction</li> <li>• Learner-centered teaching</li> <li>• Cognitive apprenticeship</li> <li>• Coaching theory</li> <li>• Growth mindset</li> </ul>	<ul style="list-style-type: none"> <li>• Programmatic assessment</li> <li>• Formative assessment</li> <li>• Learning analytics</li> </ul>

**Figure 2** The five core components of competency-based medical education: an organizing framework, from a Delphi study to produce a framework for evaluating implementation of competency-based medical education programs, 2015–2016. Practice: Competencies required for practice and/or for graduates form the basis for the planning and delivery of all curricular elements. Principle: Given adequate preparation, unambiguous goals, sufficient learning resources, and time flexibility, students can, with rare exceptions, achieve defined competencies. Curricular components working together create meaningful learning experiences. Conceptual frameworks: mastery learning and constructive alignment.

# Core Components of CBME

- Outcome Competencies
- Sequenced Progressively
- Tailored Learning Experiences
- Competency-Focused Instruction
- Programmatic Assessment

# Core Components of CBME

- **Outcome Competencies**
- **Sequenced Progressively**
- **Tailored Learning Experiences**
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- **Programmatic Assessment**

# Outcome Competencies

- Competencies required for practice are clearly articulated
- Required outcome competencies are based on a profile of graduate and/or practice-based abilities
- Conceptual frameworks:
  - Outcome-based education
  - Backwards design
  - Job task analysis
  - Social accountability

# Sequenced Progressively

- 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 medical education or practice
- A sequential path supports the development of expertise

# Tailored Learning Experiences

- 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
- Conceptual frameworks:
  - Situated learning
  - Deliberate practice
  - Self-regulated learning
  - Professional identity formation

# Competency-Focused Instruction

- 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
- Conceptual frameworks
  - Learner-centered teaching
  - Coaching theory
  - Cognitive apprenticeship
  - Growth mindset

# Development of RIMM Curriculum

- What unique skills does a rural community need from an internal medicine physician?
- What does a trainee need during internal medicine residency to competently and confidently enter rural practice?

# Development of RIMM Curriculum

- What unique skills (**outcome competencies**) does a rural community need from an internal medicine physician?
- What (**sequenced, tailored learning experiences and competency-focused instruction**) does a trainee need during internal medicine residency to competently and confidently enter rural practice?

# Competencies for Rural and Underserved Practice

- Agency and courage
- Adaptability
- Resilience
- Integrity
- Comprehensiveness
- Abundance in the face of scarcity and limits
- Reflective practice
- Collaboration and community responsiveness

*Competence Revisited in a Rural Context*, Longenecker R, Wendling A, Hollander-Rodriguez J, Bowling J, Schmitz D; Fam Med. 2018;50(1):28-36

# MMC rural self-study results

- The **“Five Themes” (Outcome Competencies)** for our rural IM curriculum:
  - The rural internist as generalist and specialist
  - Advanced procedure training for the rural internist
  - Rural population health
  - Teamwork and leadership in rural practice
  - Lifelong learning and teaching in rural practice

# Sequenced Progression of RIMM “Themes”

	PGY-1	PGY-2	PGY-3
Generalist-Specialist	Primary care Explore specialty options	Primary care Identify specialty niche	Primary care Solidify specialty niche
Advanced Procedures	Core procedures Explore advanced procedure options	Core procedures Identify advanced procedure goals	Core procedures Solidify advanced procedures
Rural Population Health	Rural health modules Addiction medicine	Rural health modules Scope of Practice Electives	Rural health modules Scope of Practice Electives
Leadership and Teamwork	Foundations of leadership	Leadership of clinical teams	Leadership within a practice and community
Lifelong Learning and Teaching	Developing the habits of a lifelong learner	TUSM Resident as teacher course EBM	MITE Clinical Teaching Certificate RIMM Chief Resident

# RIMM Tailored Learning Experiences

- Procedure training: individualized to learner's career goals
- “Flex Time”: weekly time for individual clinical or research pursuits
- Coaching and mentorship on elective choices
- Rural curriculum: “scope of practice electives” to guide research and learning on additional clinical skills needed for future practice

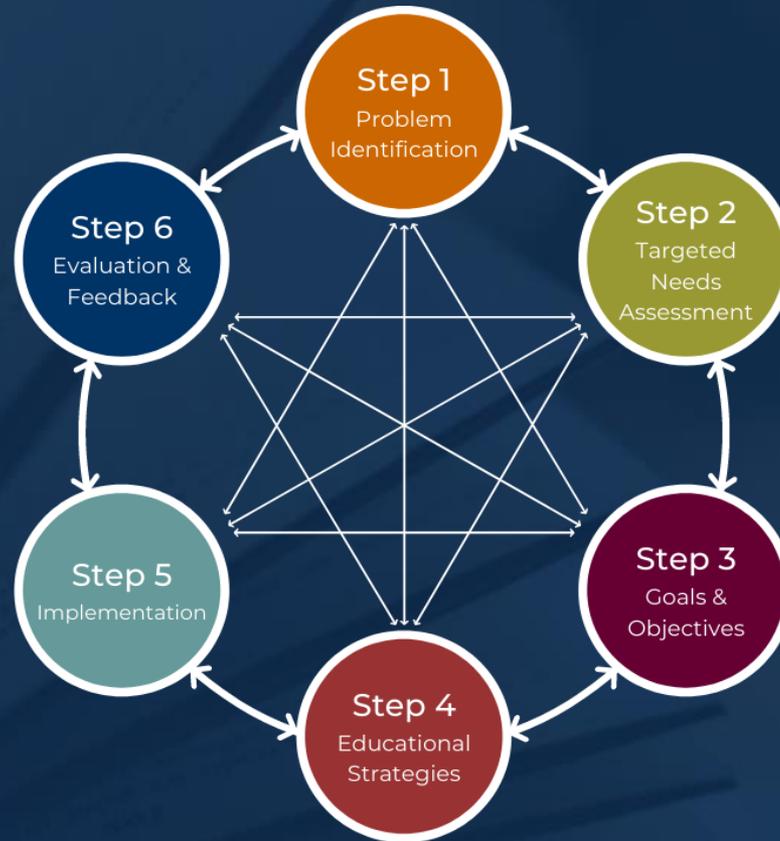
# Activity #2

- For the educational project you are working on, articulate 1-2 outcome competencies required for practice.
- For your desired outcome competencies, think about how you would:
  - Progressively sequence the competencies
  - Tailor the learning experiences and offer flexibility
  - Offer competency-focused, individualized instruction

# RIMM Outcomes

- Graduate placement in rural primary care practice: 100%
  - 3 of first 4 graduates practicing in rural Maine
- Advanced procedure training:
  - Cardiac stress testing, skin biopsies, colonoscopy
- ABIM board pass rate 100%
- Local influence: growth of rural tracks within other MMC specialties
- Regional influence: Maine Rural GME Collaborative (MERGE)
- National influence: ACGME Rural Track Program

# Kern's Six-Step Model



“Competency-based medical education is 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.”<sup>14</sup>

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