

Reducing Diagnostic Error by Using Educational Milestones to Organize Curricula and Assessment

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The Rip Out on approaches to reduce diagnostic error in this issue of the *Journal of Graduate Medical Education* offers practical strategies for defining, teaching, and assessing critical thinking.¹ Valuable by itself, this approach can be applied in greater detail to inform curricula, teaching strategies, and resident assessment, using a crosswalk between curricular Milestones² and the Trowbridge³ 12 concepts to avoid errors in clinical reasoning.

The detailed curricular Milestones developed by the internal medicine community in 2009 are not the reportable components of the Next Accreditation System currently being implemented by the Accreditation Council for Graduate Medical Education. They represent a very detailed framework of the attainment of competence and can be used to inform curricula and approaches to resident evaluation. Mapping the Trowbridge concepts against the Curricular Milestones identifies at least 28 milestones that capture the knowledge, skills, or attitudes relevant to teaching and assessing critical reasoning (BOX). Given the relevance of critical reasoning and avoiding diagnostic errors to the range of clinical specialties, the applicability of these concepts goes far beyond internal medicine.

The added detail provides a framework that identifies granular examples of specific knowledge, skills, and

attitudes or behaviors for use in curriculum development and resident assessment. The concepts at the intersection of the Trowbridge more general concepts and the curricular milestones lend themselves to (1) the design of teaching vignettes, (2) drawing attention to particular aspects of these 28 milestones in discussions about the care of patients to avoid diagnostic errors, and (3) using these milestones to inform resident formative assessment, with the added benefit of enhancing the utility and richness of feedback to residents.

In summation, the detailed milestones related to critical thinking can serve as the foundation for a more detailed curriculum for critical thinking, as well as provide formative feedback to learners as they develop competence in this vitally important clinical skill.

Resources

1. Iobst WF, Trowbridge R, Philibert I. Teaching and assessing critical reasoning through the use of entrustment. *J Grad Med Educ.* 2013;5(3):517–518.
2. Green ML, Aagaard EM, Caverzagie KJ, Chick DA, Holmboe E, Kane G, et al. Charting the road to competence: developmental milestones for internal medicine residency training. *J Grad Med Educ.* 2009;1(1):5–20.
3. Trowbridge RL. Twelve tips for teaching avoidance of diagnostic errors. *Med Teach.* 2008;30(5):496–500.

BOX CROSSWALK OF THE TROWBRIDGE 12 TIPS TO AVOID DIAGNOSTIC ERROR AND THE INTERNAL MEDICINE MILESTONES

▪ Understand heuristics

1. Medical Knowledge (MK)–A4: Demonstrate sufficient knowledge to diagnose and treat undifferentiated and emergent conditions

▪ Use “diagnostic timeouts”

1. Patient Care (PC)–C3: Modify differential diagnosis and care plan based upon clinical course and data as appropriate
2. Practice-Based Learning and Improvement (PBLI)–F2: Actively seek feedback from all members of the health care team
3. PBLI–F3: Calibrate self-assessment with feedback and other external data
4. PBLI–F4: Reflect on feedback in developing plans for improvement

▪ Think “worst-case scenario medicine”

1. MK–A8: Understand the relevant pathophysiology and basic science for uncommon or complex medical conditions
2. MK–A7: Demonstrate sufficient knowledge to evaluate complex or rare medical conditions and multiple coexistent conditions

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BOX CONTINUED

- **Approach common problems systematically**

1. PC-C1: Synthesize all available data, including interview, physical examination, and preliminary laboratory data, to define each patient's central clinical problem
2. MK-A3: Demonstrate sufficient knowledge to evaluate common ambulatory conditions
3. MK-A2: Demonstrate sufficient knowledge to diagnose and treat common conditions that require hospitalization

- **Ask why**

1. PBLI-B2: Classify and precisely articulate clinical questions
2. PBLI-B3: Develop a system to track, pursue, and reflect on clinical questions

- **Teach/emphasize physical examination**

1. PC-A3: Obtain relevant historical subtleties that inform and prioritize both differential diagnoses and diagnostic plans, including sensitive, complicated, and detailed information that may not often be volunteered by the patient
2. PC-B4: Routinely identify subtle or unusual physical findings that may influence clinical decision making, using advanced maneuvers where applicable

- **Teach Bayesian theory**

1. MK-B3: Understand prior probability and test performance characteristics
2. Systems-Based Practice (SBP)-E2: Minimize unnecessary care including tests, procedures, therapies, and ambulatory or hospital encounters
3. SBP-D2: Understand how cost-benefit analysis is applied to patient care (ie, via principles of screening tests and the development of clinical guidelines)

- **Acknowledge your emotions**

1. Professionalism (P)-F4: Recognize and address personal, psychological, and physical limitations that may affect professional performance
2. P-I2: Recognize and manage conflict when patient values differ from your own
3. P-E3: Recognize and manage subtler conflicts of interest

- **Identify what doesn't fit**

1. PBLI-E1: Determine whether clinical evidence can be generalized to an individual patient
2. PC-C4: Recognize disease presentations that deviate from common patterns and that require complex decision making

- **Embrace zebras**

1. MK-A8: Understand the relevant pathophysiology and basic science for uncommon or complex medical conditions
2. PC-F9: Manage complex or rare medical conditions

- **"Slow down"**

1. PBLI-G1: Maintain awareness of the situation in the moment and respond to meet situational needs
2. PBLI-G2: Reflect (in action) when surprised, apply new insights to future clinical scenarios, and reflect (on action) back on the process

- **Admit mistakes**

1. P-A3: Accept personal errors and honestly acknowledge them