Perspective/Opinion

How our Diagnostic Reasoning and Evidence Based Medicine Curriculum Align with Millennial Learning Philosophy

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Dear Millennial: When it comes to educational philosophy, I am like you, but in a Generation X body. Instead of rote memorization, I seek value, understanding, and depth. In this essay, I hope to convey "why" a medical school curriculum bolstered by a diagnostic reasoning and evidence-based medicine thread is existentially valuable and aligns with your learning philosophy ...

Dear Millennial Learners,

I was born in 1978, and I have a hard time interpreting Millennial slang. At best, I'm a poser who thinks he understands, only to be reminded that I have no clue. I once heard a Millennial say to another, "Stay woke," only to realize they weren't asking the other person to "stop slumbering."

While I may not share your year of birth nor understand some parlance, I subscribe to your learning philosophy and strive for **R**ationale (as compared to rote memorization) within a **R**elaxed and **R**apport-promoting learning environment that is buttressed by **R**elevant and **R**esearch-driven content.

Think about the last time you had asked someone "Why?" in response to something they had said. Did their answer resemble one of the following?

1. "That's just how I do it."
2. "Because that's what [*insert authority*] says"
3. "Because that's what the [*insert reference*] says."
4. "Because…uhh…"

Were you satisfied with one (or more) of these answers? What about the phrase "I don't know?" When learning, how often have you heard (or were encouraged to say) these three words? I opine that the process of learning must begin with acknowledging what we don't know (agnosticism) and then asking the "who, what, when, where, why, and how" questions, which serve to discover information, clarify misinformation, and enables and empowers us to seek truth.

Now fortified with the language of a (shared) learning philosophy, I aspire to show you how a diagnostic reasoning and evidence-based medicine (EBM) curriculum aligns with your five 'R' philosophy, and importantly, will encourage you to say, "I don't know", enable and empower you to seek truth, and stay on a pathway towards diagnostic expertise. But before I do, let me digress and offer a bit of history to clarify why my colleague Dr. Michael Putman and I have chosen diagnostic reasoning and EBM as the pillars of our "Critical Thinking in Medicine" thread.

David Sackett and the birth of Evidence Based Medicine (EBM)

I'd like to introduce you to one of my heroes, David Sackett, who was a medical student in the 1950s. At the time, clinical intuition and pathophysiologic rationale formed the basis for all clinical decisions. Deemed a troublemaker for pushing the envelope with his epistemological-based line of questioning ("Why?" or "How do you know that?"), he stood alone, but resolute, on his view that clinical experience was not enough to guide optimal clinical decision making and he was a catalyst that pioneered the EBM movement. In the 1980s, the nascent EBM movement established its first principle:

> *Not all evidence is equal and that the practice of medicine should be based on best available evidence and that the pursuit of truth is accomplished by evaluating the totality of evidence and not selecting evidence that favors a particular claim.*

With a cemented first principle, Sackett (literally) pushed a cart full of articles on rounds where he taught learners critical appraisal skills to challenge existing paradigms, and along the way, promoted a non-hierarchal culture of bidirectional mentorship (where his mentees became his mentors).

"You gotta get the diagnosis right"

At this point, you might be asking, "What does EBM have to do with diagnosis?" Well, Sackett advised caution against the misapplication of evidence and suggested that, for evidence to be

applicable, “You gotta [sic] get the diagnosis right!” and clinical decisions must be filtered through patient values and preferences.

With a correct diagnosis, management and prognosis are guided. And with an incorrect, delayed, or no diagnosis, “evidence” will be misapplied and ineffective and harmful. In other words, the application of evidence depends upon a correct diagnosis, which means learners must have a strong foundational knowledge (which you learn in your first two years of medical school) and understand the steps and scientific underpinnings of the diagnostic process (not well taught in medical schools today).

Sackett’s words (“You gotta get the diagnosis right”) especially resonate in today’s clinical learning environment, where arriving at an accurate and timely diagnosis and application of best evidence-based practices are encumbered by factors such as less face-to-face time with patients, more FaceTime with the electronic health record, and the provision of hand-off medicine. Therefore, setting learners on a pathway towards diagnostic expertise (i.e., by teaching and deliberately practicing the process of how to arrive at a diagnosis) and equipping them with skills to appraise and apply evidence position students to go beyond the *rote practice* of medicine, and instead, instill habits that encourage the *deliberate practice* of medicine, which aims to augment knowledge and calibrate skills in search of the truth and enhance patient care.

Let’s see how the proposed diagnostic reasoning and EBM curriculum aligns with your 5 R learning philosophy of ***Research-Based Methods, Relevance, Rationale, Relaxed, and Rapport.***

Research-based Methods

The proposed diagnostic reasoning curriculum aims to set learners on a pathway towards diagnostic expertise by teaching them both the (a) semantics and the (b) science while (c) providing tools for reflection and metacognition. Each component is rooted in cognitive science and contributes to learning the diagnostic process, which is unique compared to traditional medical education. In addition, the diagnostic process is considered a “black box,” where learners see what information enters and exits the box but remain confused as to “how” one arrived at a diagnosis.

The proposed curriculum allows learners to peer inside the black box to see *how they think* and tailor their learning. For example, to understand *how* one arrives at a diagnosis, we teach the science of cognition, which includes theories of decision-making and environmental factors that promote cognitive biases. Since being prone to cognitive biases depends on an individual’s background, learners may choose to utilize some cognitive forcing strategies over others, permitting them to individualize their approach to the diagnostic process.

Relevance

Optimal patient care depends on an accurate and timely diagnosis and skills to critically appraise and apply evidence. Instead of asking *what* (is the diagnosis) questions, our curriculum emphasizes *how* and *why* questions and promotes reflective practices. For example, we avoid asking: *what* is the differential diagnosis? When a learner is asked for a differential diagnosis for acute onset chest pain, the answers (to the *what* question) may be misaligned, incomplete, and without epidemiologic and mechanistic drivers of chest pain.

Instead, a pathophysiologic or anatomical *approach to chest pain* may be more valuable, especially when a learner is verbalizing and writing/drawing the approach and linking (patient) context, which promotes understanding of the *how and why*. Furthermore, physicians have a duty to explain to their patients the *how* (understanding of epidemiologic factors) and *why* (understanding of pathophysiologic basis) they have an ailment. When a learner can verbalize understanding, it may promote more accurate knowledge transfer to a lay patient, which may enhance the patient-physician relationship.

Rationale

The proposed diagnostic reasoning and EBM curriculum sets students on a pathway towards seeking the truth in a manner that should make sense to them. When you learn a new discipline (e.g., medicine, chess, soccer), you must master the language. Think about the terms *ipsilateral* or *morbilliform* – did you understand what these terms meant before medical school? Thus, we begin by teaching the language of the diagnostic process and EBM. Next, since arriving at a diagnosis is a *decision*, one must be aware of decision-making theories and dispositions that affect decision-making.

Our curriculum emphasizes and re-emphasizes and deliberately practices the language and scientific underpinnings of the diagnostic process.

Relaxed (environment)

For educators, a key benefit of promoting free and honest communication with a safe space is that it provides a “window” into learner understanding, which opens up opportunities for coaching and feedback. Our curriculum is built to encourage free and honest (verbal and written) communication and expects "failure," which we understand is a key ingredient for

learning. We view “not having the right answer" as an opportunity for coaching, feedback, and intervention.

Rapport

Deliberate practice of the diagnostic process and EBM will occur in small group work, incorporation into observed structured clinical examinations, and learning communities. Illness script maturation, diagnostic scheme and mechanistic map formation and revision are more fruitful when practiced in groups. In addition, free and honest communication, reflection, and metacognition are encouraged between groups members, which promotes personal relationship building.

If it weren’t for individuals like David Sackett, the EBM movement might not be with us today and patients would end up “paying the piper” for decisions made from outdated textbooks or rote and unchallenged experiences. I like to think of Sackett as a Millennial trapped in a Silent Generation body. And since you, dear Millennials, are the fearless advocates for social causes and have pushed your predecessors to reform medical education, it will be your successors, Generations Alpha and Beta, who will think of you as one of theirs in a Generation Z body.

Sincerely,
Jayshil Patel (one of yours in a Generation X body)

Jayshil Patel, MD, is an Associate Professor in the Department of Medicine, Division of Pulmonary and Critical Care Medicine at MCW. He is on the Curriculum pillar of the Robert D. and Patricia E. Kern Institute for the Transformation of Medical Education. He has developed a diagnostic reasoning curriculum for undergraduate and graduate medical education programs, and with Dr. Putman, aims to develop a Critical Thinking in Medicine (diagnostic reasoning and evidence-based medicine) thread for the new medical school curriculum.