Clinical Reasoning: Talk the Talk or Just Walk the Walk?

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O nce the purview of the research community, clinical reasoning concepts are increasingly used to inform how teachers teach and learners learn.[1] This welcome development has been signaled by the widespread use of clinical reasoning terminology in teaching sessions, conferences, and general medical publications. Technical terminology arises in any community where foundational units of knowledge (eg, *terabyte* or *osmosis*) are necessary for members to communicate with precision and brevity.[2] For interdisciplinary fields like clinical reasoning, terminology evolves iteratively as multiple groups think about a problem independently, develop knowledge and language simultaneously, and then use these terms to communicate between groups.[3] Given this evolutionary process, it is helpful to periodically examine the state of terminology and its utility to the members of a community.

In this issue of the *Journal of Graduate Medical Education*, Musgrove et al[4] compared the frequency of clinical reasoning terms in 79 published clinical problem solving exercises to a ranking of clinical reasoning concepts by a group of educators at a single academic center. They found that educators prioritized some of the same concepts that were featured prominently in published exercises (eg, *problem representation*, *illness script*, and *dual process thinking*), but that published exercises placed greater emphasis on such concepts as *bias* and *context specificity*.

Given the different goals of clinical instruction and case reports, this discrepancy is not surprising. Teachers often frame their instruction around undifferentiated patients in ways that put reasoning front and center in order to stimulate the triggering and sorting of common diagnoses. In contrast, published cases prioritize the retrospective review of an engaging dilemma, often resolved by an unusual diagnosis. Clinical reasoning is at the core of the reader's journey, but whether the case illustrates a specific clinical reasoning concept is often an afterthought.

The analysis by Musgrove et al[4] raises many interesting questions about these terms and their usage, but front line educators should consider this fundamental question: Is learning clinical reasoning lingo useful for teachers or their trainees?

Teachers

Every medical educator teaches clinical reasoning. Whenever knowledge is broadcasted, it has the *potential* to be incorporated by the learner and applied to a future patient encounter. This learning transfer depends on multiple factors, including learner motivation,[5] previous exposure to content,[6] cognitive load,[7] and emotional valence of the content.[8] Instructors can deliberately craft their teaching so that improved reasoning is an intentional goal and not just a fortuitous by-product. But to do so consistently they need to understand clinical reasoning concepts.

The main debate around teaching clinical reasoning is whether the instructor should aim to shape learners' *knowledge structures* or aim to shape learners' *thought processes*. Discussion continues regarding the merits and pitfalls of each approach.[9,10] Teachers who focus on the development of long-term memory structures pay close attention to how knowledge is scripted in the brain.[11] They aim to enhance knowledge through mixed practice[12] (eg, "I will assign you 3 different headache cases during the coming week in clinic") and repetition with real world cases.[13] They insist on refined assessments (eg, "Can you summarize the key aspects of this case in 1 sentence?") because of the central role of problem representations in script activation. They ask questions that force the learner to compare and contrast illness scripts (eg, "Why is this venous stasis and not cellulitis?"). These teachers do not have to articulate script-related terms during instruction to achieve the desired results, but a theoretical foundation helps to organize a consistent teaching approach.[14]

Teachers who focus on thought processes aim to calibrate trainees' mode of cognition along the continuum of pattern recognition and analytical reasoning. To do this, instructors focus on the

shortcomings in human reasoning and propose methods to avert them.[15] Defining and illustrating subconscious heuristics and biases creates awareness of potential cognitive pitfalls (eg, "Note our tendency to miss the clavicle fracture on this radiograph demonstrating pneumonia; that is called *search satisficing bias*.") and guides teaching strategies (eg, "Use a systematic approach to every chest x-ray to avoid anchoring on a finding.").

In these ways, clinical reasoning terms become the scaffolding on which clinical teachers develop their teaching practices, regardless of whether they ever verbalize these terms to their learners. Understanding clinical reasoning processes can inform assessment[16] as well as remediation plans for struggling learners.[17] Above all else, teachers can use these insights to encourage their team to think about how learning and thinking unfolds while evaluating a patient. Such reflection may not improve in-the-moment diagnostic accuracy,[18,19] but coaching learners in this way may improve performance on similar cases in the future.

Trainees

Trainees who aspire to become lifelong learners must become well versed in analysis, feedback, and reflection on their own cognitive performance. In order to operationalize this form of self-directed learning, trainees also need to understand the basic vocabulary of clinical reasoning.

Long before we taught medical students the term *pretest probability*, physicians revised subjective probability assessments of disease based on epidemiology or test results because that is the way the brain is wired. But when we give trainees the knowledge and vocabulary of evidence-based medicine, they have the opportunity to practice and communicate probability revision with precision. Even if we never taught students the 4 pillars of medical ethics—benevolence, nonmaleficence, autonomy, and justice—we could expect them to be ethical because of their cultural upbringings. But they would have no framework to grapple with tough decisions that involve trade-offs among these moral principles; they would sense these conflicts without having ways to articulate or resolve them.

And so it goes with clinical reasoning. No one becomes competent at clinical reasoning solely because they understand illness scripts, heuristics and biases, or semantic qualifiers.[20] But when we want to optimize our reasoning, knowing clinical reasoning terminology becomes essential. The framework of deliberate practice suggests that self-directed learners need to know what to be deliberate about in order to improve their reasoning performance.[21] A toolbox of clinical reasoning concepts empowers them to engage in learning activities that have the best chance of improving their reasoning skills. They can purposefully build illness scripts through spaced exposure to a problem like acute monoarthritis, read in a manner that prioritizes the comparing and contrasting of illness scripts (vertical reading[1]), or habitually seek follow-up on the outcomes of patients that they transfer to colleagues.

Conclusion

Clinical reasoning terms represent a shared language for teachers and trainees to dissect how they think about and learn from clinical problems. The article by Musgrove et al[4] reminds us that this can happen in the context of a real world case or a published case, and that the latter can be a powerful learning tool for individuals or teams. The best clinical problem solving exercises begin with a challenging problem, stimulate trainees to practice their decision-making skills, and selectively introduce the nomenclature of clinical reasoning. Great teachers of clinical reasoning follow that same playbook when they discuss real world patients because they understand this key point: Knowing the terminology isn't essential to do clinical reasoning; it's only essential to do it better.

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