Editorial

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Competencies for improving diagnosis: an important developmental step forward

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Improving diagnosis and reducing diagnostic error has become a major focus of healthcare and health professions education. The National Academy of Medicine's (NAM) 2015 report, *Improving Diagnosis in Healthcare*, along with Makary and Daniels's sobering 2016 report on medical error, have recently served to highlight the seriousness of the problem [1, 2]. Graber and colleagues, building on the NAM report, made a compelling argument that existing training programs are not adequately educating current learners in diagnostic safety, and a "clear mandate" exists to improve health professional education in diagnostic reasoning and safety [3].

This issue is also deeply personal. I often reflect on my own diagnostic errors during my time as a practicing physician and use these events in my faculty development. Both my mother and father experienced multiple, serious diagnostic errors in their later years; for my father, a diagnostic error would ultimately prove to be fatal. As the 2015 NAM report noted, every American can expect to experience at least one diagnostic error in their lifetime [1]. Given the importance of diagnostic reasoning throughout a health professional's training and career, how did we arrive at the current state of affairs?

While the causes are clearly multifactorial, several deserve special attention. First, there is still an overemphasis on approaching the diagnostic reasoning process as the solo act of healthcare professionals and those in formal training. This mindset promotes an overreliance on what the healthcare professional and learner carry on their cerebral "hard drives". This mindset has been further reinforced by a continued overreliance on high-stakes examinations, usually in the form of multiple choice questions (MCQs). To be clear, such examinations can, and do, provide some quality assurance to the public that a health professional does possess a sufficient level of medical knowledge and competence in diagnostic reasoning for clinical practice. Individual ability in diagnostic reasoning, and possession of medical knowledge, still matter (a lot), and a physician in the US will take no less than five examinations to ultimately achieve certification

in a specialty. Yet, despite the fact that all practicing physicians have passed these high-stakes examinations for decades in the United States, diagnostic error remains a pernicious, harmful problem affecting thousands of patients annually. This obvious discordance signals the urgent need to rethink our approach to teaching and assessing diagnostic reasoning.

In this issue of *Diagnosis*, Olson and colleagues present a new set of competencies to improve diagnosis. How can a new set of competencies help address the diagnostic error challenge? First, competencies help define and codify essential professional abilities. A competency framework can facilitate better and more robust mental models of diagnostic reasoning that in turn guide improvements in curricula and assessments. Second, competency frameworks help to advance disciplines by calling explicit attention to specific knowledge, skills and attitudes previously neglected or poorly understood. Finally, competencies can assist in harmonizing and aligning curricula and assessments across healthcare professions, educational programs and institutions. The interprofessional lens of this new competency framework helps to reframe the challenge of how to teach and assess diagnosis with its unique and interdependent focus on the individual, team and system levels.

The individual competencies (I-competencies) highlight the growing science around diagnostic reasoning that will be valuable to training programs and faculty. The I-competencies also call attention to the critical, but too often neglected, skills of history taking, physical examination and communication. Here, training programs and faculty can still utilize the power of direct observation, an "old approach", to teach and assess these skills as part of the diagnostic process at the bedside. Patients can, and should, be part of this process – a major contribution of this new set of competencies [4]. More importantly, patients *want* to be part of this process.

The I-competencies also explicitly highlight essential skills in using decision support tools, point-of-care resources and consultation. The reality is (and actually has been for a long time) no single individual can carry all knowledge needed on their "hard drive". Evidence-based

practice skills can be effectively taught and assessed [5, 6]. While the I-competencies importantly expand and refine our conception of the essential individual abilities for 21st century diagnostic practice, the framework's other major contribution will be the addition of team-based and systems-related competencies.

Diagnostic reasoning must now be routinely approached as an interprofessional team activity. Even in the context of a controlled, online learning platform using case scenarios, the *Human Diagnosis Project*, Barnett and colleagues found that groups of two to nine physicians, each working independently, substantially outperformed individual physicians in diagnostic accuracy, up to a 30% absolute difference [7]. Should we really be surprised? Caring for actual patients in the chaotic environment of hospitals and clinics adds additional contextual complexity to the diagnostic process. For example, past research has shown many admission diagnoses change, often substantially, by the time of discharge. Wenger and Shpiner found in an internal medicine residency morning report study over 25 years ago that a firm diagnosis was still not available at discharge for 24% of patients presented, and for another 17% the final discharge diagnosis differed from the diagnosis at morning report [8]. Fast forward to an era with substantially reduced lengths of stay with older and sicker patients, it is clear that effective diagnostic reasoning for the hospitalized patient must be conducted with team input.

Steve Durning and I highlighted the concept of situated cognition when thinking about diagnostic reasoning [9]. Situated cognition argues that thinking (cognition) emerges from individuals and teams acting in concert with their environment. It shifts the emphasis from solely the individual to healthcare professionals and teams interacting with the patient (and family) within a specific setting or encounter. Viewed through this perspective, the new team-based and system-based competencies in diagnosis can help practitioners and educators see both synergistic and disadvantageous interactions between teams and the environment. Explicit team-based strategies, such as interprofessional rounds, huddles and family rounds must be incorporated into the daily work of healthcare and medical education, informed by these new competencies to deepen new mental models around the diagnostic process.

Another major contribution from the framework, cutting across all three levels, is the critical need to involve patients as partners in the diagnostic process. Nothing irritated me more as a faculty attending than to have another physician or learner report that the "patient was a poor historian". The irony with this statement should be clear

– it is the health professional who is the historian. Healthcare professionals have the moral and ethical obligation to work with patients and families to co-produce an accurate diagnosis. Too many tragic diagnostic error stories involve poor data gathering and/or listening skills on the part of health professionals. Viewing diagnosis as a non-hierarchical, collaborative, co-produced process between a healthcare team and the patient, situated within a functional system, can help to reduce diagnostic error.

Finally, the incorporation of systems-related competencies is an important advance. Institutions need to create supporting structures and processes to facilitate effective diagnostic reasoning by individuals and teams. This means providing functional health information technology, efficient access to clinical resources and point-of-care decision tools, and the time to learn how to use information technology effectively [5, 6]. As the old saying goes, an ounce of prevention (an accurate diagnosis) is better than a pound of cure (remediating a diagnostic error).

It also means institutions will need to increasingly rethink the clinical care delivery model with regard to patient encounters – especially given the effect institutional-level performance has on the future clinical practice of its graduates [10, 11]. The implication is clear – it is likely learners will have the same diagnostic practices and performance patterns as the systems in which they trained.

Institutions must also get serious about leveraging existing information technology to create meaningful feedback loops about diagnostic accuracy and errors as highlighted in the S-2 competency [4]. Singh and colleagues performed an elegant study by systematically reviewing why patients returned unexpectedly to the hospital, emergency department or clinic after a primary care clinic visit. Diagnostic error was a common reason for these unexpected return visits, often involving problems with history taking, physical examination and/or ordering diagnostic tests for further workup [12]. They noted that many of these errors were associated with a high risk for significant harm. These findings highlight the interdependencies of individual skills and the need to observe them, in conjunction with team-based input and systems that can provide meaningful and timely feedback. These type of feedback loops must become the standard in medical education. All of this can be done now with proper educational and clinical care design. The new competencies from Olson and colleagues provide a useful and meaningful step to move us forward so that future patients do not have to suffer the harmful consequences of missed and delayed diagnoses. I know my parents would have appreciated and benefitted from these efforts.

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