

Teaching Clinical Reasoning Skills to Help your Learners “Get” the Diagnosis

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Clinical teachers aspire to improve the knowledge and skills of their learners, but deliberate teaching of clinical reasoning can seem overwhelming and even impossible. Expert clinicians unconsciously run through checklists, leap past details and take short cuts to reach correct diagnoses. How can this clinical reasoning process be taught in a step-wise fashion to learners? Our students and residents must learn the skills of clinical reasoning for the care of their patients, for communication with colleagues, and for the education of those they teach. Relying on time and experience to develop these skills is insufficient. Clinical teachers should facilitate this process despite its challenges. Using the concepts of illness scripts, problem representations [1], and semantic qualifiers [2] clinical teachers can create a foundation for learner's to guide clinical reasoning development and improve learner's abilities to communicate an effective patient assessment.

Novice clinicians struggle to understand what a “good” assessment is because they lack the ability to create succinct yet accurate problem representations. A problem representation is the one sentence summary in which specific patient details (history, physical examination) are synthesized into abstract terms called semantic qualifiers. For example, imagine a student in their second year of medical school who is learning about appendicitis. A patient with “two days of 9 out of 10 abdominal pain” should be described as having “acute and severe” abdominal pain. “Acute” and “severe” are examples of semantic qualifiers. Semantic qualifiers generally exist in divergent pairs, such as acute vs. chronic and severe vs. mild. When a learner uses semantic qualifiers to synthesize the details of a patient's history and physical into abstract terms, they are creating an illness script. Illness scripts are the mental constructs that clinicians use to create clinical memories of their experiential knowledge about diseases and conditions. These abstract representations are rich with clinical detail, and the distinctive features of a disease or condition become “anchor points” in a clinician's memory that can be easily accessed for clinical reasoning when similar cases arise in the future [1].

Expert clinicians store medical knowledge of diseases, conditions and syndromes as illness scripts, which have the following structure: predisposing condition, pathophysiologic insult, and clinical consequences [1,3,4]. After hearing a chief complaint an expert clinician begins almost immediately creating multiple hypotheses (a working differential diagnosis). Experienced physicians access multiple illness scripts from their past clinical experience and scientific knowledge. Further data is acquired from the patient and medical records and discriminating features between illness scripts are explored. When a physician sorts through the patient's information and connects it with a clinical memory, they select the appropriate illness script, thereby creating a working diagnosis. Expert physicians can access many illness scripts due to years of experience and learning and have the ability to adeptly discriminate between relevant illness scripts in order to select the correct diagnosis for a given patient. Novice clinicians have only a few illness scripts. Therefore, instead of approaching a patient by non-analytic pattern recognition and facile comparisons of diagnostic information, they must always rely on deliberate analysis of the details. This process of pattern recognition is quick and typically accurate if you possess the appropriate illness scripts [2]. However, the pattern recognition that is used in clinical reasoning is inherently non-analytic. Therefore, it is difficult for inexperienced clinicians, such as medical

students and junior residents, to generate a genuine assessment of a patient's history and physical examination because it relies on clinical experience and not just critical thinking skills. This explains why novice clinicians can easily become mired in the details of a clinical case-losing the proverbial forest for the trees. Their assessments in clinical documents are frequently summaries of the history, physical and key findings rather than communicating a true interpretation and assessment of the case.

The illness script format can be used to teach novice clinicians how experts critique differential diagnoses. For a new patient with an undiagnosed condition, educators can lead learners to use semantic qualifiers to synthesize the patient data and begin to consider different aspects as portions of an illness script-predisposing conditions and clinical consequences. As this discussion unfolds, learners offer at least two plausible diagnoses. For each potential diagnosis, specific illness scripts are constructed side by side using the “classic” presentation of the potential diagnosis, which allows learners to contrast the predisposing conditions, pathophysiologic insult, and clinical consequences for the potential diagnoses. The patient's data can then be compared to the “classic” data populating each of the scripts. This technique is a deliberate and slower example of what expert clinicians do when they analyze clinical presentation. In addition to generating a sophisticated patient assessment, this technique can be used to derive the appropriate evaluation and treatment for the patient.

Leading learners to intentionally develop illness scripts fosters early practice with the non-analytical reasoning processes more commonly used by expert clinicians. These guided interactions with non-analytical reasoning provide the opportunity to discuss with learners cognitive biases that can lead to diagnostic errors. Fixating on a specific clinical feature too soon in the clinical encounter (anchoring bias), settling on a given diagnosis before fully examining other options (premature closure), and interpreting information so that it supports your prior conclusion (confirmation bias) are examples of different biases which can impact the non-analytic reasoning process [5]. Discussing the potential for such errors enhances the process of learner clinical reasoning development by providing a balanced picture of non-analytical reasoning.

Clinical educators recognize that it is often challenging for novice clinicians to synthesize the details of patient information into concise yet accurate clinical assessments [6]. Learners frequently receive only vague coaching on the subject and struggle to understand what

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the assessment statement should entail. Clinicians can teach medical students and residents to use semantic qualifiers and illness scripts to create formal problem representations. These constructs represent a pragmatic method for teaching learners the non-analytical processes that expert clinicians combine with their analytic clinical reasoning skills to accurately diagnosis and treat their patients.

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