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Learning How to Think: JGIM's Clinical Reasoning Series

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"I've had a horrible summer," said Mrs. W., a previously robust and healthy nonagenarian, when I first met her in the noisy and crowded emergency room. She was fatigued, and had lost her appetite, as well as 10 pounds of weight. She was too tired to care for herself and had been coughing "constantly" over the last week. A linguist, Mrs. W. had travelled the world in the 1970s and 80s before returning to settle near her family who supported her in order to continue to live independently. Mrs. W. had a cough, hypoxemia, an elevated white blood cell count, and a chest x-ray infiltrate (albeit an atypical one). This was a clear cut case of community acquired pneumonia—my first one! We were not sure why she had declined functionally over the last few months, but planned on treating her pneumonia and setting her up for close outpatient follow up. Three days after admission her pneumonia hadn't improved. Just prior to rounds on her fourth hospital day, my intern got off the phone with the microbiology lab and said "Sputum positive for Tb." He proceeded to stop Mrs. W's antibiotics for community-acquired pneumonia and contacted the infectious diseases consultant to help treat her tuberculosis. Unfortunately, ten days into her hospital stay, Mrs. W. succumbed to her illness.

As a third-year medical student on my first clinical rotation, I was stunned to have missed a diagnosis of tuberculosis—a condition we had spent an extraordinary amount of classroom time learning about. In retrospect, the pieces to solve this puzzle were there, but we had chosen to put them together differently, ignoring the jagged edges that hinted at our mistake. Viewed from the perspective of positive sputum cultures, her atypical x-ray infiltrate suddenly stood out as the "classic" miliary tuberculosis pattern. Her cough and subacute functional decline now had a clear unifying cause. The entire team possessed all the *facts* needed to solve the case, and yet we had somehow failed to do so. We were devastated by the outcome, but unclear how to prevent this from happening again. "How can we learn from this?" my attending asked as we debriefed this case the next day. Instantaneously, my intern responded: "teach us *how to think*."

Diagnostic errors are widespread and every clinician experiences them.[1] The Institute of Medicine's report on "Improving Diagnosis in Health Care" declares that improving the diagnostic process "represents a moral, professional and public health imperative" with education in the diagnostic process delineated as a key goal.[2] Data from malpractice suits reveals that the vast majority of missed diagnoses in internal medicine are common conditions: myocardial infarction, cancer, and pulmonary embolism.[3] As with Mrs. W., the majority of these mistakes involve errors in clinical reasoning; the way physicians put information together to form a diagnosis.[4]

Most medical schools and residency programs lack formal curricula in clinical reasoning as the importance of the meta-cognitive process in clinical reasoning has not been explicitly described until recently. Therefore, exposure to clinical reasoning occurs when trainees observe expert clinicians performing patient care or solving clinical conundrums in conferences. Learning in this fashion teaches trainees to value medical facts, but the clinical reasoning remains obscure. This leads some trainees to feel as if advanced diagnostic skills are beyond their reach. We believe that a resource that both outlines and demystifies the clinical reasoning process is needed to address this educational chasm.

The *Journal of General Internal Medicine*'s (JGIM) Exercises in Clinical Reasoning (ECR) series began publishing cases in 2010.[5] The ECR series presents interesting cases in the classic Clinical Problem Solving (CPS) format, but takes the extra step of discussing the meta-cognitive approach that the expert clinician uses to arrive at the diagnosis. The series is heavily influenced by the clinical reasoning literature and draws upon cases from all over the United States, Canada, and Japan. The cases range from the routine to obscure, but all have the common thread of outstanding clinicians discussing cases when the cognitive load (amount of available information) is high. Demystifying how these experts think about clinical dilemmas makes what is invisible (sorting a dizzying amount of clinical information) now visible (creating a reproducible approach to deductive reasoning in patient care).

To further our ability to help educators teach these important reason-

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ing concepts to trainees (and each other), we recently expanded our materials to the JGIM Web site. There, we provide educators with robust teaching tools focused on clinical reasoning. Downloadable cased-based teaching slides developed from the ECR cases are currently available on the website. These cases emphasize core clinical reasoning concepts: dual process theory, illness scripts, and problem representation. Embedded with a teaching guide, these PowerPoint presentations promote group-based learning by engaging teachers and learners alike. The built-in curricular flexibility enables teachers to deliver the content in short, 15–30-minute interactions, such as Attending Rounds, or more formal hour-long sessions, such as Noon Conference. In the coming months, additional teaching presentations addressing other fundamental reason-

ing concepts such as diagnostic schema, anchoring bias and Bayes Theorem are planned.

Along with the abundance of resources available to physicians to add to their medical knowledge, a parallel wealth of tools is needed to enhance our profession's clinical reasoning. We invite you to utilize, participate, and contribute to our collective journey as we use the ECR series to help in learning *how to clinically reason*.[6]

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