Clinical Reasoning: Unleashing the Sherlock Holmes in Our Students from the Start

George Novan, MD
Associate Director, WWAMI Spokane
Clinical Professor of Medicine
University of Washington School of Medicine

Background
It’s time to change. As Dr. Jerome Kassirer, former editor of the New England Journal of Medicine, has written: "The teaching of clinical reasoning need not and should not be delayed until students gain a full understanding of anatomy and pathophysiology." This monograph will briefly cover why and how I teach an initial approach to medical thinking and reasoning.

Why teach clinical reasoning so early?
• Links basic science to clinical medicine
• It’s fun
• It motivates

How should clinical reasoning be taught?
It should be case-based and the case should be real. Real cases are the best because they:
• Mirror what happens in the real world
• Present the uncertainties, inconsistencies, complexity
• Can be presented as they unfolded and in chunks

Thoughts about thinking
There is much in the medical literature dealing with the process of clinical reasoning. There are articles about how clinical reasoning occurs, and how we might want to refine it to reduce the errors we humans make when thinking through a medical puzzle. If you read this literature, you will run across words such as: metacognition, dual mode processing, cognitive debiasing, cognitive forcing structures, and cognitive dispositions to respond (CDRs),

The literature has generated its own vocabulary that may just muddy the waters it is trying clear. Rather than spending time defining abstract terms, it seems prudent to simplify an approach to medical thinking yet still be aware of the literature in case you do want to go diving into those muddy waters.
How does clinical reasoning occur?
Dr. Geoffrey Norman and Dr. Kevin Eva describe clinical reasoning as involving two pathways: a non-analytical one and an analytical one. A experienced clinician moves back and forth from one pathway to the other in evaluating patients since some problems can be resolved quickly and others need more in depth thinking. Graphically, the pathways are:

Characteristics of the two pathways:

<table>
<thead>
<tr>
<th>Non-Analytical</th>
<th>Analytical</th>
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<tr>
<td>instinctive (intuitive)</td>
<td>deliberate</td>
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<tr>
<td>first impressions</td>
<td>mindful weighing of pros and cons</td>
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<tr>
<td>pattern recognition</td>
<td>based on logic, probabilities</td>
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<tr>
<td>affected by emotions</td>
<td>less likely to be error-prone</td>
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<tr>
<td>often valuable insights but prone to error</td>
<td>activated by inconsistencies in the intuitive</td>
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Gaining skills in clinical reasoning
Some authors claim that a person has to practice for 10,000 hours to become an expert. But those are not ordinary hours -- they are 10,000 hours of deliberate practice. To quote a Fortune magazine article, deliberate practice is:

...activity that's explicitly intended to improve performance, that reaches for objectives just beyond one's level of competence, provides feedback on results and involves high levels of repetition. For example: Simply hitting a bucket of balls is not deliberate practice, which is why most golfers don't get better. Hitting an eight-iron 300 times with a goal of leaving the ball within 20 feet of the pin 80 percent of the time, continually observing results and making appropriate adjustments, and doing that for hours every day - that's deliberate practice. ...It's the same story in surgery, insurance sales, and virtually every sport.

(Accessed on 2/7/2012)
As with everything else, thinking skill gains involve deliberative practice. Even before classes begin, even before the science is drummed into the brain, the practice can start. By cutting through the jargon of vocabulary associated with the clinical reasoning literature, we can teach a simplified system that can be used from the start.

All it takes to reason

- A flexible mind
- The power to observe and reflect
- The ability to ask questions
- A willingness to learn from others

A simplified, 4-step approach to thinking through a medical puzzle

Taking what I’ve read in the literature, what I have taught to residents and students doing their clinical training, and my own approach, I suggest this method:

1. What is the first diagnosis or disease that pops into my mind as I’m hearing the story?
2. OK, what other things can I think of?
3. Anything, even if low probability, that I can’t afford to miss because it might be lethal to the patient?
4. Now that I have my list of possibilities, how should I sequence or prioritize them -- in other words, think (reflect) about my thinking?

The shorter, card carrying version of the 4-step approach:

1. What is the first thing that pops to mind?
2. OK, what else can I think of?
3. Anything that might kill?
4. Now that I have a list, how do I want to sequence the possibilities?

Implementing these Ideas

During orientation (their first day of medical school), I divide our WWAMI Spokane students into groups and present a patient case asking them to make a diagnosis. After all, I say, isn’t that the reason they came to medical school -- to diagnose patients?

Once the incredulousness wears off, I tell them that there is safety in numbers, no idea is out of bounds, and that even without any classes yet, they have a collective wisdom based on their shared experiences (some in clinical settings.) With the right hints and nudges, they do "solve" that first case. And their appetites have been whetted.

This day one exercise is also a shameless plug for a selective course I teach entitled Med S 600-2: Medical Thinking and Reasoning (now known to our students as MTR.) Almost all our students take it.
The opening page of the MTR web site has this introduction:

Medical education has finally caught on -- it's never too early to start thinking and reasoning like a physician.

Becoming a seasoned clinician requires medical knowledge and experience. You may not have these yet. But, you do have common sense and you do have the capability to reflect on your own thinking. Using these two skills primarily plus what you will soon find to be a rapidly expanding knowledge base, the faculty in this course will guide you through exercises that traditionally are the types of teaching sessions experienced by upper level medical students.

Welcome to an elective that aims to give you a head start on your clinical years.

During the course, students work in groups to solve the case of the week. I choose a case that ties into the subject matter of the basic science courses already taken.

**Personal Observations and Conclusions**
The students relish anything clinical in their basic science years. The chance to try and receive training in clinical reasoning has motivated and has been fun -- for both students and teachers.

Early on there may be a bit of perseveration -- supplying only the few diagnostic possibilities with which they might be familiar -- for every case presented. Later as they gain experience, learn to reflect about a broader list of possibilities, and listen to the ideas of their group, their answers become more focused. Naming (actual specific diagnoses) isn't as important in year one. Rather it more about whether they can deduce potential pathologies and pathophysiologies.

One additional benefit has been that students become comfortable in expressing their thoughts out loud. This may translate into a greater likelihood of speaking up in teaching sessions and rounds when they hit their clerkship years.

**References**
1. Fuks A, Boudrea JD, Casell EJ. Teaching clinical thinking to first-year medical students. Medical Teacher 2009 Feb;31:105-11.