Cracking the Code to Clinical Reasoning: The Power of Metacognition

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Introductions

Getting To Know You!
Learning Objectives

• Explore the definition and theory of clinical reasoning and its relationship to diagnostic errors.

• Identify the value of metacognitive strategies to prevent cognitive biases and promote optimal clinical reasoning.

• Develop strategies to successfully incorporate discussion of clinical reasoning in case conferences, intern/morning reports, and dedicated clinical reasoning conference.

• Brainstorm approaches to promote clinical reasoning on teaching rounds and in the resident outpatient clinic.
Activity #1: Needs Assessment

- Should we be talking about diagnostic errors?
Diagnostic Errors

• Medical errors are estimated to be the third leading cause of death in the US

• Accounts for 250K deaths yearly (1)

• Diagnostic errors
  – Account for an estimated 40k-80k deaths annually (2)
  – Estimated to happen in 10% cases
  – Associated with serious disability
  – Highly ranked in medical malpractice claims
  – Most often deemed preventable

US
40,000 – 80,000 deaths/yr
1 in 20 primary care visits involves a preventable dx error; half are potentially harmful

Your Hospital
10 deaths every year
10 patients harmed every day in your clinics or ER

Error-related Harm

Diagnostic Error

Leape et al.  JAMA  288:2405, 2002
Claims Data: High-severity Cases
Top allegation category: Diagnosis Error

N=584 high-severity PL cases asserted 1/1/02-8/31/07.
Total Incurred-aggregate of expenses, reserves, and payments on open and closed cases.
Institute of Medicine

“It is likely that most of us will experience at least one diagnostic error in our lifetime, sometimes with devastating consequences”
Etiology of Diagnostic Error

Both System and Cognitive Errors 46%

Cognitive Error Only 28%

System Error Only 19%

No Fault Error Only 7%

Graber et al., Archives of Internal Medicine, 2005
Activity #1: Needs Assessment

• Should we be talking about diagnostic errors?
• Why don’t we talk about it then?
Activity #1: Needs Assessment

• Should we be talking about diagnostic errors?
• Why don’t we talk about it then?
• What does clinical reasoning have to do with this?
Clinical Reasoning

The ability to “sort through a cluster of features presented by a patient and accurately assign a diagnostic label, with the development of an appropriate treatment strategy as the end goal”
How do doctors think?
Case #1:

• You are seeing a 45 yo gentleman with low grade fever and weight loss. Examinations reveals a heart murmur and lesions on the fingers. You notice anemia on labs with an AKI. Urinalysis shows an active sediment. You decide to admit the patient and get blood cultures and an echocardiography that confirms your diagnosis of infective endocarditis.

• How was the diagnosis made?
System I thinking (Non analytic)

- Relies on heuristics/pattern recognition/ Illness scripts
- Intuitive
- Adaptive
- Efficient
Script Theory
Heuristics

• “A simple procedure that helps find adequate, though often imperfect, answers to difficult questions”

– Pattern recognition
– Illness scripts
– Availability
Non-analytic thinking

• Most often accurate
• Imperfect

MCQ test
System II thinking (Analytic)

- Hypothetico-deductive reasoning
- Analytical
- Robust decision-making
- Reflective
- Time consuming
- Lack efficiency
Which system do we use more?

**SYSTEM 1 AND SYSTEM 2 PROCESSING**

**“FIRST REACTIONS”**

System 1 = fast, automatic, impulsive, associative, emotional, and unconscious processing ≈ limbic.

**“THINKING”**

System 2 = slower, conscious, reflective, deliberative, analytical, rational, logical processing ≈ neocortex.

![Brain Diagram](image)
How do doctors think?

- System 1: Automatic, subconscious processing
  - EXPERT | HEURISTIC
  - Repetition
  - Diagnosis

- System 2: Deliberate, conscious thought

- Recognized?
Cognitive Hazard…

• You are seeing a 25 yo female with a chief complaint of nausea, vomiting, & abdominal pain. Your colleague takes you aside and tells you: "She's always here with gastroparesis. Challenging and demanding patient.” You give the patient reglan and advise small meals.

• You get a page the following day that she is admitted with a ruptured appendicitis.

• Reviewing the chart, you note that the patient mentioned to the nurse that this feels very different that her usual symptoms.
Cognitive Biases

- Framing Effect
- Availability Bias
- Anchoring Bias
- Confirmation Bias
- Diagnostic momentum
- Playing the odds
- Premature Closure

Croskerry P, Acad Med, 2003, 78(8), The Importance of Cognitive Errors in Diagnosis and Strategies to Minimize Them
Who is the expert diagnostician?

The concept of a well calibrated physician
Activity #1: Needs Assessment

• Should we be talking about diagnostic errors?
• Why don’t we talk about it then?
• What does clinical reasoning have to do with this?
• So what is Metacognition?
Metacognition:

thinking about one's own thinking,
knowing about one's own knowledge,
understanding one's own understanding,
etc.
So.....

- Cognitive diagnostic errors potentially linked to cognitive biases
- Cognitive biases tied to the unconscious systems of thinking
- Metacognitive forcing strategies can help us dissect our thinking, create diagnostic checkpoints, and thus avoid cognitive pitfalls
- Heightened metacognition is a potential strategy to minimize cognitive biases, improve clinical reasoning, and avoid diagnostic errors
Activity #2: The Cognitive Autopsy

• Three clinical scenarios:
  – Identifying the diagnostic error that occurred
  – Brainstorming the clinical reasoning pitfalls that occurred in terms of cognitive biases
  – Create a cognitive fishbone diagram around the case
The Evolution of A Clinical Reasoning Curriculum

The Cleveland Clinic Experience.
Metacognition and Clinical Reasoning Conference

- One Hour Conference Targeting All PGY Levels
- Brief Clinical Vignette
- Small Group Activity to Evaluate & Manage the Patient in Real Time
- Patient course with diagnostic error is then revealed to large group
- A ‘cognitive autopsy’ ensues
- Small groups also reflect on cognitive biases in their own group
- Conference ends with revision of biases identified in the case
Don't believe everything you think.
Hazard Analysis

1. Anchoring
2. Diagnostic Momentum
3. Anomaly
4. Framing
5. Overconfidence

Diagnostic Timeout

Pink: 1999
Yellow: 1600
Blue: 1399
Green: 800

What evidence goes for or against? Why is the patient not fitting my illness story?
What doesn’t fit? What am I missing?
What else could it be? Am I being biased?
Why is it not improving or following a good course? About my treatment plan?
Is my treatment not working? Am I more concerned about this patient?
### Table A: Select Items from the Intervention Evaluation Questionnaire (n=102)

<table>
<thead>
<tr>
<th>Question</th>
<th>Percent Agree or Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>I enjoy the clinical reasoning conference</td>
<td>92.1</td>
</tr>
<tr>
<td>I learn valuable information at the conference.</td>
<td>95.1</td>
</tr>
<tr>
<td>I feel those sessions help with team building among residents</td>
<td>83.3</td>
</tr>
<tr>
<td>I gained new perspectives after attending these sessions</td>
<td>90.2</td>
</tr>
<tr>
<td>I am more aware of my cognitive biases</td>
<td>90.2</td>
</tr>
<tr>
<td>After the sessions I find myself reflecting how my cognitive biases influence my clinical care</td>
<td>78.4</td>
</tr>
<tr>
<td>These sessions improve my clinical approach and decision making</td>
<td>95.1</td>
</tr>
<tr>
<td>These sessions help me become a better clinician</td>
<td>96.1</td>
</tr>
<tr>
<td>Some of my clinical decisions have changed after attending these sessions</td>
<td>69.6</td>
</tr>
</tbody>
</table>
Activity #3: “Beyond the Classroom”

• How do we take “metacognition” to the bedside?
• What are challenges to implementing a diagnostic checkpoint?
• How can we overcome those challenges?
Suggested Strategies

• Explicitly describe heuristics and how they affect clinical reasoning
• Explicitly discuss biases
• Acknowledge how the patient makes the clinician feel
• Admit one’s own mistakes
• Encourage learners to slow down
• Timely and constructive feedback
Coaching the reasoning process...

• Reason aloud technique
  – Cases presented in chunks
  – Intermittent reasoning in between
  – Be specific
  – Can be done both directions
  – Can be done at a conference or at the bedside

• It is not easy!!
  – Puts you on the spot
  – Requires a comfortable and safe learning environment
  – Requires time
Coaching the reasoning process...

- Integrate structured reflection
  - Differential diagnosis
  - Rank differential diagnoses
  - List concordant features
  - List discordant features
  - List missing features
- What else could it be? Why?
- Diagnostic Timeout!
Panel Discussion

- Dr. Abby Spencer (CCF IMRP Program Director)
- Dr. Ali Mehdi (CCF IMRP Director of Clinical Reasoning)
- Dr. Susan Vehar (CCF IMRP Rising CMR)
- Dr. Megan Mcgervey (CCF IMRP Rising CMR)
Resources for Educators

• Trowbridge et al. Teaching Clinical Reasoning. ACP Teaching Medicine Series. 2015

• http://www.improvediagnosis.org/ (Highly recommended)
Resources for Educators

• Journal series with clinical reasoning exercises:
  – AJMS: Clinical Reasoning: A Case-Based series
  – JGIM: Exercises in Clinical Reasoning
  – JHM: Clinical Care Conundrums
  – NEJM: Clinical Problem Solving
Key References:


- Croskerry P, (2003). The Importance of Cognitive Errors in Diagnosis and Strategies to Minimize Them. Acad Med 78(8),
Thank you
Every life deserves world class care.