From Mindless to Mindful Practice – Cognitive Bias and Medical Decision Making

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Case 1

- A 4-year-old boy, no significant medical history and no history of asthma presented to the PED in the winter with acute-onset respiratory distress. The triage nurse noted increased work of breathing, decreased air movement, and wheezing. He was placed on nebulized albuterol by facemask over 1 hour.

- The intern documented subcostal retractions and minimal wheezing and reported to the supervising pediatric emergency medicine fellow that he was “too tight to hear wheezing because of poor air movement.” Oxygen saturation was 88% in room air, RR was 40, and HR was 150. He was normotensive and afebrile. A chest x-ray (CXR) was completed.

- Before it was read, the child developed progressively severe respiratory distress and became obtunded. He was emergently intubated.

- The preintubation CXR showed a soft tissue density in the midtrachea. He was tracheally intubated. He was subsequently taken to the OR. Rigid bronchoscopy revealed a macerated, partially chewed hotdog fragment in the right main stem bronchus, which was removed. The child was admitted to the PICU and recovered without further complications.

Park et al, Ped Emerg Care 2014
Case 2

- A 12-year-old girl, with a history of asthma, complained of shortness of breath and chest pain shortly after beginning a basketball game. Despite using her inhalers, she appeared to be worsening and an ambulance was called. She was given nebulised albuterol by facemask and immediately taken to the nearby PED. On arrival she deteriorated further, stopped breathing and had a cardiac arrest.

- Chest compressions were initiated immediately and she was intubated. Despite prolonged efforts by the resuscitation team she did not respond and all further efforts were ceased after an hour.

- At autopsy she was found to have a tension pneumothorax.
Case 3

- A 21 y/o male arrives at the ED with multiple stab wounds to the chest, arms and head. One of the chest wounds is inferior to the L scapular.

- OE: Talking, cooperative, inebriated, no dyspnoea or SOB, AE = bilaterally, O2 Sat N; 130/80, HR 80-90. Lac on scapula deep – local wound exploration → did not penetrate the pleural cavity, ribs palpable with pleura behind. EDTUS: good views, no free fluid. Serial abdominal exams N, rectal exam N. CXR N.

- Lacerations irrigated, explored, and repaired. Discharge Dx: Stab wound chest. D/C Home

- 5 days later presented to a different hospital with vomiting, blurred vision and difficulty concentrating

- CT scan showed penetrating wound to brain
How do we think?

Problem solve
Reason
Make decisions
Decision Making

Intuitive
(System 1)
- Fast
- Informal
- Subjective
- Context-dependent
- Qualitative

Rational
(System 2)
- Slow
- Formal
- Objective
- Context-independent
- Quantitative
Two main areas of decision making in medicine

Making the diagnosis
+ Treating the patient
So how much can we trust intuition?
Medical Intuitions

- Fast
- Compelling
- Frequent
- Minimal cognitive effort required
- Addictive
- Mostly serve us well
- Occasionally catastrophic
How can we control intuitions?

Mindfulness
What is Mindfulness?

Nonjudgmental awareness of the present moment
Clinician Mindfulness and Patient Safety

Erica M. Sibinga, MD, MHS
Albert W. Wu, MD, MPH

Patient safety has been a topic of considerable interest over the last decade, with evidence showing that medical errors are responsible for substantial morbidity and mortality. There has been significant progress in understanding, identifying, and addressing errors at a system level; however, the performance of individual clinicians remains a crucial and

Roots of Diagnostic Errors
Cognitive dispositions to respond that influence the diagnostic process are characterized by a lack of awareness and responsiveness by the individual to his or her own cognitive and affective processes.2,3 For example, confirmation bias favors the pursuit of data that support a diagnosis over data that refute it. This may be compounded by anchoring bias, a resistance to adapting appropriately to subsequent data that suggest alternative diagnoses. Together, confirmation and anchoring bias can result in an incorrect diagnosis. This, in turn, reduces the chance of ameliorative treatment and
The two major products of clinical decision making are diagnoses and treatment plans. If the first is correct, the second has a greater chance of being correct too. Surprisingly, we don’t make
How well do we do?
CMPA Data: 347 legal actions closed 2005 - 2009
Legal outcome by critical incident

CMPA Data: 347 legal actions closed 2005 - 2009

Number of patients
Diagnostic Failure

15%
Estimated number of preventable hospital deaths due to diagnostic failure annually in the US

40,000 – 80,000

Leape, Berwick and Bates  JAMA 2002
~125,000
Why does misdiagnosis occur?

- The system (25%)
- The individual (75%+)
What is the clinician’s problem?

- Isn’t bright enough
- Doesn’t know enough
- Isn’t trying hard enough
- Isn’t thinking rationally
- Is cognitively impaired
- Is not having a good day
The IOM Quality Chasm Series
‘The critical thinking in understanding the common causes of cognitive errors can be and should be taught to all health professionals, particularly physicians, nurse practitioners and physician’s assistants who will be in a primary diagnostic role …’

George Thibault MD
It is likely that **most of us** will experience at least one diagnostic error **in our lifetime**, sometimes with devastating consequences.
Mostly, it’s not what we don’t know, it’s how we think

We need to know more about how we think...
Dual Process Theory
THINKING, FAST AND SLOW

DANIEL KAHNEMAN

WINNER OF THE NOBEL PRIZE IN ECONOMICS

2011
Dual Process Decision Making

System 1: Automatic/streamlined

System 2: Cautious/complex
Type 1 and Type 2 processes
(dual process theory)
Getting medicine is not easy
Life is about learning the basic patterns
Getting medicine is not easy
Getting medicine is not easy
Getting medicine is not easy
Axial view of fMRI activation of the brain as a function of practice over 60 minutes

Hill and Schneider, 2006
How much of our time is in System 1?
Cognitive thought is the tip of an enormous iceberg. It is the rule of thumb among cognitive scientists that unconscious thought is 95% of all thought – this 95% below the surface of conscious awareness shapes and structures all conscious thought’

Lakoff and Johnson, 1999
So, we have to learn how best to deal with System 1
Swallowing saliva
Would you drink a glass of your own saliva?
The emotion of disgust (Type 1) overcomes rational input (Type 2)
So how do we become better decision makers
The occasional slap might wake some people up
Essentials for optimal CDM

- Learning about how the brain makes decisions
- Factors that influence decision making performance
- Awareness and understanding of cognitive and affective biases
- Understanding of rationality
- Knowledge of the logical fallacies - recognition and mitigation
- Cognitive bias detection and mitigation strategies
- Learning about mindfulness and reflection
Special Section: Open Forum

The Ethical Imperative to Think about Thinking

Diagnostics, Metacognition, and Medical Professionalism

MEREDITH STARK and JOSEPH J. FINS

Abstract: While the medical ethics literature has well explored the harm to patients, families, and the integrity of the profession in failing to disclose medical errors once they occur, less often addressed are the moral and professional obligations to take all available steps to prevent errors and harm in the first instance. As an expanding body of scholarship further elucidates the causes of medical error, including the considerable extent to which medical errors, particularly in diagnostics, may be attributable to cognitive sources, insufficient progress in systematically evaluating and implementing suggested strategies for improving critical thinking skills and medical judgment is of mounting concern. Continued failure to address pervasive thinking errors in medical decisionmaking imperils patient safety and professionalism, as well as beneficence and nonmaleficence, fairness and justice. We maintain that self-reflective and metacognitive refinement of critical thinking should not be construed as optional but rather should be considered an integral part of medical education, a codified tenet of professionalism, and by extension, a moral and professional duty.

Keywords: medical decision making; medical ethics; professionalism; medical education; medical error; diagnostic error; patient safety; cognition; judgment; metacognition

No longer an option...
“It sort of makes you stop and think, doesn’t it.”