Confronting Cognitive Errors in Medicine

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Duke Psychiatry Grand Rounds
An 18-y/o woman arrives at 6:00PM to the ED, sent from her psychiatrist’s office.

Psychiatrist asked that the ED “rule out pneumonia.”

**PMH:** severe anxiety and depression

**Meds:** SSRI & OCP

**FHx:** depression and anxiety in mother, bipolar disorder in aunt

**CC:** “My psychiatrist told me to come to make sure my symptoms are due to anxiety and not to pneumonia.”
ROS: 6 days of SOB, episodes of palpitations and “panic”

Physical Exam
Vitals: HR 105, RR 22, BP 116/82, Temp 36.8, pain 0/10
Gen: thin, anxious, asking when she can leave to smoke
Lungs: CTAB
CV: tachy, regular, no g/m/r

Signout: “Sent here to r/o pneumonia. Patient has been afebrile. Lung exam is clear. CXR is w/o infiltrates. Tachycardia and tachypnea fit with her anxiety. The patient agrees.”
Attending agrees.

Patient sent out w/ psychiatry f/u.

A few minutes later...

Resuscitation attempted, but unsuccessful.

Autopsy reveals scattered pulmonary emboli as well as a massive pulmonary saddle embolus.

*Diagnostic failure – due to the interplay of multiple cognitive biases, resulting in the failure to reach a simple diagnosis*
Cognitive Errors... and Antidotes

- Medical errors
- Common cognitive errors
- Analyze case
- “Metacognition”
- Strategies for confronting & overcoming common cognitive errors
- Strategies for teaching metacognition
IOM 1999 Report “To Err is Human”

~98,000 people die in hospitals each year due to preventable medical errors

Types of Errors

**Treatment**
- Wrong dose of a medication

**Preventive**
- Neglecting appropriate screening

**Communication Failure**
- Failure to convey medical urgency

**Equipment Failure**
- Malfunctioning ventilator

**Diagnostic**
- Errors or delay in diagnosis
Diagnostic Error

- System-based vs cognitive errors
- Diagnostic cognitive errors due to faulty:
  - knowledge 3%
  - data gathering 14%
  - synthesis of information 83%

Conceptualizing Cognitive Errors

- Pat Croskerry
  - ER physician
  - founding father of the study of cognitive errors

- Cognitive Dispositions to Respond (CDRs)
  - unconscious
  - instantaneous
We are trained to recognize clinical patterns

Diagnosis by pattern recognition takes place faster than we can think with intention

**Example:** A bat and a ball together cost $21 ... if a ball costs $2, what does a bat cost?

We perform this subtraction without thinking (unlike when we first learned to subtract)
Heuristics – Pattern Recognition
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Experts primarily recognize clinical patterns known as ‘type 1’ or heuristic thinking.

Beginners spend time methodically processing known as ‘type 2’ or analytic thinking.

Type 1 thinking is faster!
- Dyspnea + b/l LE edema = CHF
- Dyspnea + unilateral LE edema after a flight = PE
- Dyspnea + fever + cough = PNA

Type 1 thinking is also highly error prone!
Good news: The set of cognitive errors that we all make on a regular basis is relatively small.

Evidence shows we can learn to recognize them – not just after they happen, but also as they happen.

Simplest example: Patients we don’t like are more often misdiagnosed.

Once you know you are prone to make a mistake, you can catch yourself and often prevent the mistake.
How to Recognize Cognitive Errors

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- **Evidence shows** we can learn to recognize them – not just after they happen, but also *as* they happen.
- **Simplest example:** Patients we don’t like are more often misdiagnosed.
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Posterior Probability – overestimating the likelihood of a dx due to the pt’s PMH
- 5 times in the past a patient has correctly been diagnosed with migraine headache
- You’re biased to believe this presentation of headache must be another migraine

Availability bias – the prevalence of a diagnosis is inflated by the ease with which you thought of this diagnosis
Common Cognitive Biases

- **Commission bias** – beneficence: strong desire to help your patient → over-action
  - On paper, you would say a therapy is not worth the risk for this patient ... but the patient really wants it, and you really want to help the patient in front of you

- **Omission bias** – non-malfeasance: fear of doing something harmful to patient → inaction
  - Declining to offer a treatment because it is “too risky,” even if quality of life is very poor without it
Common Cognitive Biases

- **Confirmation bias** – looking for evidence to support rather than refute a diagnosis

- **Psych-out bias** – attributing all symptoms to a known psychiatric diagnosis

- **Premature closure** – when the diagnosis is made, the thinking stops

- **Hassle bias** – Justifying inaction due to the hassle of action

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Common Cognitive Biases

- Search Satisficing – calling off the search once a diagnosis is found
  - 48-y/o woman w/ a PMH of substance abuse is evaluated in the ED for AMS
  - UA has 2+ leukocyte esterase & 10WBCs; UDS + cocaine
  - Pt disoriented, observed wandering, and moved to PEU
  - Nurse asks why the patient is so “wobbly on her feet”
  - Head CT reveals subarachnoid hemorrhage

Q: What’s the most commonly missed fracture?

A: The second fracture
Common Cognitive Biases

- **Framing** – when the initial description of the case strongly shapes your thinking

- **Diagnosis Momentum** – when a diagnosis becomes a “label” and influences thinking
  - Pt admitted with new onset psychosis
  - ED resident writes “r/o schizophrenia”
  - “Probable schizophrenia”
  - “Presumed schizophrenia”
  - “19-y/o admitted w/ new dx of schizophrenia”
Anchoring – locking on to certain features

- Your patient comes in complaining of falls
- You elicit a history that the patient has fallen *backwards*
- You recall that falling backwards is rare
- You recall that falling backwards is a unique feature of Progressive Supranuclear Palsy
- You conclude that your patient *must* have PSNP
Categories of Diagnostic Errors

- Overattachment to a dx
  - Anchoring
  - Confirmation bias
  - Premature closure

- Inheriting others’ thinking
  - Diagnostic momentum
  - Framing effect

- Failure to consider an alternative or 2° dx
  - Search satisficing

- Misperception of prevalence
  - Availability bias
  - Posterior probability error

- Affective biases
  - Psych-out error
  - Like/Dislike a patient

- Physician attributes
  - Hassel bias
  - Commission/Omission bias

MISTAKES
It could be that the purpose of your life is only to serve as a warning to others.
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An 18-y/o woman is seen in the ED.

She arrived at 6:00PM.

She was sent from psychiatry clinic where she was being seen for depression and anxiety.

Psychiatrist sent her to the ED for “rule out pneumonia.”
Diagnosing Cognitive Errors

CC: "To make sure my symptoms are due to anxiety"

Search Satisficing

ROS: SOB, palpitations, episodes of "panic"

Confirmation Bias

Signout: "Sent here to r/o pneumonia. Afebrile. Lung exam clear. CXR is clear. Symptoms fit with her anxiety."

Framing Bias & Dx Momentum
Yikes! How Do We Avoid These?
METIOCRITY

It takes a lot less time
And most people won't notice the difference
Until it's too late
Yikes! How Do We Avoid These?

- Be familiar with common cognitive biases
- Acknowledge that we are all prone to make these errors
- Be familiar with when these biases are most likely to occur
- At those moments, stop to check yourself for biases (metacognition)
- Use “cognitive forcing strategies” to force yourself to confront common cognitive biases
When Are Errors Most Common?

- Transitions in care
  - You come onto a service, you are “accepting” the diagnosis told to you from previous team
  - When you admit a patient, you are working from the diagnosis suggested by the ED or the referring MD
  - When you see a recent discharge, you are working from the discharge diagnoses

- Hectic – busy day or at the end of a shift
  - Relying more heavily on type I/heuristic thinking
  - More likely to succumb to Confirmation Bias, Hassle Bias, or Premature Closure
Metacognition

**Transitions in care**
- When accepting a new patient (or picking up a new team): “This is an opportunity to re-examine the workup to-date and to look for any possible **gaps or assumptions.**”
- Receiving handoff: “Is this a **working diagnosis** or has this been **confirmed**?”
- When giving handoff: “What ambiguity needs to be **emphasized**? What language can I use to indicate what we **know** vs what we **suspect**?”

**Hectic, many new admissions, or end of the day**
- Ask not just, “What do I think is the most likely diagnosis?” but also, “If it **isn’t** that, what **else** would it be?”
Cognitive Forcing Strategies

- Analogy: before locking your car door, you pat your pockets to make sure you have your keys.

Generic Forcing Strategies
- What sort of error is most likely to occur here?
- What’s the “runner-up” diagnosis?
- What diagnoses can I not afford to miss?

Specific Forcing Strategies
- For any patient w/ dyspnea, always get SpO₂
Teaching Metacognition

- When working with students, point out where cognitive errors are prone to occur ... and where you have made them in the past
- Think out loud: Share your heuristics and your metacognition
- Share your cognitive forcing strategies
- While it’s important to ask a learner to commit to a diagnosis, it’s also critical to nurture ambiguity – it’s important to ask “what else must we simultaneously consider?”
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Whenever URACE, tie your LACES

- **U** nexplained symptoms
- **R** eturn visit (same problem)
- **A** t-risk patient populations
- **C** itical condition
- **E** nd of shift
- **L** ife threats considered?
- **A** nything else it could be?
- **C** oherency vs non-fit?
- **E** verything explained?
- **S** econd problem present?
Most medical errors are diagnostic errors, and of those, cognitive errors are the most common.

Each of us is prone to cognitive biases – every day and with every patient.

There are predictable circumstances during which cognitive errors are more likely to occur and more likely to have consequences.

We can learn to check ourselves as we are making diagnostic decisions, catching biases as they play out.

We can foster ambiguity and consider multiple diagnoses.

Simple forcing strategies can help us avoid cognitive errors.
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“It ain't what you don't know that gets you into trouble.... It's what you know for sure that just ain't so.”

— Mark Twain
Questions
Acknowledgements

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References


