Clinical Reasoning, Diagnostic Error, and YOU

Ruth Franks Snedecor, MD
Objectives

• At the end of this session, participants should be able to:
  • Outline the steps/progression of the clinical reasoning process. What makes a novice? An expert?
  • Define diagnostic error and cognitive error, and identify and describe several cognitive errors seen in physician practice.
  • Recognize cognitive errors in common medical delivery settings and utilize cognitive debiasing strategies to combat them.
Why this matters...

Institute of Medicine in 2000: Annual patient deaths attributed to medical error in US hospitals: \textbf{44,000-98,000}

Estimated cost: $17 - $50 billion

“A Jumbo Jet a day”

Healthgrades Report in 2004: \textbf{191,000} deaths/yr

Estimated cost: $6.3 billion/yr

Diagnostic Error

• 18-20% of all preventable medical errors
  - Harvard Medical Practice Study

• ~1/2 of all litigation against ER physicians arises from delayed or missed diagnoses

• Postmortem review conducted over 4 decades found that nearly 1 in 10 patients suffered a major ante-mortem diagnostic error
  • Best recent study suggests that it is closer to now to 5%
    • Improved diagnostic testing

• Diagnostic error remains the most common reason for paid malpractice claims in ambulatory patients
  • Ranked #2-#5 in medical malpractice claims

• Nearly 1 in 25 patients are mistakenly sent home with MI.
  • And those that are sent home have a much higher mortality rate
Diagnostic Error

- Systems Error
  - follow-up labs
  - poor communication

- Cognitive Error
  - Didn’t expand differential
  - Correct dx not available in brain
Systems and Cognitive Errors Travel Together

- Forgot to follow-up on lab results
- Poor communication among consultants.

- Didn’t expand differential diagnosis
  - “This pt is too young to have an MI”

- Forgot to follow-up on troponin/EKG. ER doctor said it was costochondritis

Graber et al, 2004
How do we think?
How do we think?

- Basketball passing
Clinical Reasoning

Building Blocks of Problem Solving

- Hypothesis Testing
- Forward Thinking
- Pattern Recognition
**Case:**
35 year old AA female with one day hx of sharp, left-sided chest pain, occurring at rest and worse with inspiration and coughing. No fevers, no SOB. Meds: OCPs
Normal exam except tachycardic.

**Diff Dx:**
- CAD
- Pneumonia
- Pericarditis
- PE
- Musculoskeletal
- Pleuritis
- GERD
Clinical Reasoning

Problem Solving Maturation

Hypothesis Testing

Pattern Recognition

Forward Thinking

Novice

Expert

100%
Forward Thinking

Defining the Syndrome

Case:
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Forward Thinking

Branched decision points to narrow a list of diagnoses
Pattern Recognition

• Pattern Recognition
  • Instantaneous recognition of a patient’s presentation as matching a specific disease—all the components (or almost all) of a known disease are present
    • Rapid fire processing
    • Further questioning searches for the missing elements of the disease
    • Accurate and Efficient.

• Pattern Recognition + clinical experience + further research + knowledge = EXPERT
Clinical Reasoning

Building Blocks of Problem Solving

- Hypothesis Testing
- Forward Thinking
- Pattern Recognition
Cognitive Error

• A failure in rational or logical thought

• Often due to biases, of which at least 50 are known to exist
  • They are universal, predictable, and correctable if you know what you are looking for
When the way we think fails us

• 720 physicians shown videotapes of patients using the exact same script for chest pain
  • White male, black male, white female, black female
  • What did they find?
  • Schulman et al, 1999

• Senior physicians more likely to correctly hospitalize patients with chest pain who went on to have real MIs.
• Another study showed senior physicians were more likely to hospitalize those without heart attacks.
  • Pearson et al, 1995
Risk seeker vs. Risk avoider

• 119 physicians given a questionnaire assessing attitudes toward risk
  • Doctors who were risk seekers (fast cars/sky diving) were 4x more likely to send the same chest pain patient home than risk avoiders
TAKING RISK
There's a fine line between taking a calculated risk and doing something dumb.
Premature Closure or Anchoring Bias

• Failure to continue considering reasonable alternatives after primary diagnosis is reached

• Lack of pertinent negatives
  • There may be no supporting evidence for the misdiagnosis in some cases

• Some studies suggest this is the most common bias
Fixation error

• Fixation errors occur when clinicians concentrate exclusively on a single aspect of a case to the detriment of other more important features
  • Sometimes clinicians persistently fail to revise a diagnosis.
• Persistent failure to recognize the true reason for the problem and the individuals involved were excessively preoccupied with only one aspect of the situation.
  • Sometimes clinicians persistently seek extraneous data and fail to decide on the definitive treatment for a likely cause of a major problem.
Fixation Error

Eastern Flight #401, Miami, Florida 1972
Diagnosis Momentum/Creep

• Also known as “chart-lore”
• Once a diagnostic label is attached to a patient chart it becomes stickier and stickier
• Early diagnosis by another provider is accepted as definite
Availability and Confirmation Bias

• **Availability bias**
  • Judge things to be more likely if they readily come to mind
  • Our thinking is strongly influenced by what is the most recent, relevant, and dramatic

• **Confirmation bias**
  • Tendency to look for confirming evidence to support a diagnosis rather than look for disconfirming evidence to refute it. Despite the latter being more persuasive and definitive
Visceral Bias

- Counter-transference

- Negative feelings toward a patient may result in diagnoses being missed

- Common types:
  - Non-compliant patients / “The patient who cried wolf”
  - Homeless patients
  - Chronic pain or Somaticizers
  - Obese patients
... if your mental state is disturbed, full of emotion, it is very difficult to cope with problems, because the mind that is full of emotion is biased, unable to see reality. So whatever you do will be unrealistic and naturally fail.

Dalai Lama
Diagnosis is the foundation of medicine. Effective treatment cannot begin until an accurate diagnosis has been made. Diagnostic reasoning is a critical aspect of clinical performance. It is vulnerable to errors and biases, which can lead to missed or incorrect diagnoses. Emotions play a significant role in this process, and understanding how they affect clinicians' decision-making is crucial for improving patient safety.

Objective: The way that health care providers feel, both within themselves and toward their patients, may influence their clinical performance. Surprisingly, few resources have been directed at how health care providers think and feel, particularly in the presence of clinical decision making. Yet there is considerable evidence.

How doctors feel: affective issues in patients’ safety

Historically, the prevailing view in medicine is that clinical decisions should be objective and free from contextual affective issues: one could not be objective and empathetic at the same time. However, recent work has shown that emotions are an inherent part of medical decision making.

The Affective Imperative: Coming to Terms with Our Emotions

Two books have directed attention to the underpinnings of doctors’ thinking. Thinking (cognitive) failures abound in clinical decision making, especially in diagnostic formulation, and taxonomies of common cognitive errors have been developed. Diagnostic failure has been identified as a major threat to patients’ safety and, this year, the American Journal of Medicine published a supplement on the problem to coincide with the first symposium on diagnostic error. Despite the tardiness of this focus on how doctors think, we welcome the advance in evidence of patient care and safety. The more difficult next step is to recognize how doctors feel, and why.

Diagnostic Failure: A Cognitive and Affective Approach

Patrick Croskerry, MD, PhD, Department of Emergency Medicine and Department of Medical Education, Dalhousie University, Halifax, Nova Scotia, Canada (e-mail: croskerry@ Dalhousie.ca).

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Framing affect

- Drawing different conclusions from the same information, depending on how or by whom that information is presented

- Just for fun:
  - Look at the next slide
  - Count the number of words in the paragraph that are repeated
The last time we got together to camp in Nova Nova Scotia we decided that it would be too cold to sleep in a tent. So, I called the motel that was located near Peggy’s Cove on top of the hill. We should call each other and talk about these plans once and for all. If you cannot call me, the best way to get in touch is by fax machine.
The last time we got together to camp in Nova Scotia we decided that it would be too cold to sleep in a tent. So, I called the motel that was located near Peggy’s Cove on top of the hill. We should call each other and talk about these plans once and for all. If you cannot call me, the best way to get in touch is by fax machine.

Answer is “3”? 
The last time we got together to camp in Nova Scotia we decided that it would be too cold to sleep in a tent. So, I called the motel that was located near Peggy’s Cove on top of the hill. We should call each other and talk about these plans once and for all. If you cannot call me, the best way to get in touch is by fax machine.

Or is the answer 6?...or is it 14?
# 30 Most Common Cognitive Errors

<table>
<thead>
<tr>
<th>Aggregate bias</th>
<th>Gender bias</th>
<th>Psych-Out Errors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anchoring</td>
<td>Hindsight bias</td>
<td>Representativeness</td>
</tr>
<tr>
<td>Ascertainment bias</td>
<td>Multiple alternatives</td>
<td>Search satisficing</td>
</tr>
<tr>
<td>Availability</td>
<td>Omission bias</td>
<td>Sutton’s Slip</td>
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<tr>
<td>Base rate neglect</td>
<td>Order effects</td>
<td>Triage-Cueing</td>
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<tr>
<td>Commission bias</td>
<td>Outcome bias</td>
<td>Unpacking principle</td>
</tr>
<tr>
<td>Confirmation bias</td>
<td>Overconfidence</td>
<td>Vertical line failure</td>
</tr>
<tr>
<td>Diagnostic creep</td>
<td>Playing the odds</td>
<td>Visceral bias</td>
</tr>
<tr>
<td>Attribution error</td>
<td>Posterior prob.</td>
<td>Ying-Yang Out</td>
</tr>
<tr>
<td>Gambler’s Fallacy</td>
<td>Premature closure</td>
<td>Zebra retreat</td>
</tr>
</tbody>
</table>
Don’t dwell on what went wrong.
Instead, focus on what to do next.
Spend your energies moving forward toward finding the answer.

Denis Waitley
I'M ALWAYS WRONG ABOUT EVERYTHING. WHAT CAN I DO TO FIX THAT?

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Cognitive Debiasing Strategies to Reduce Diagnostic Error

• You are here!
• Be skeptical
• Think the opposite
• Forced consideration of other possibilities
• Decrease reliance on memory (VINDICATE)
• “Cognitive walkthrough” strategies.
  • Reason out loud or simulation
• Minimize time pressures (slow down) and ensure access to accurate information (get more info)
• Avoid rushed decisions especially diagnoses
• Accountability and Feedback on decisions made

Croskerry et al, 2003
Specific Debiassing Strategies

• Visceral Bias
  • Shake it off or Two Feet One Breath
    • Being mindful

• Fixation error
  • STEP BACK
  • Get a second opinion/Group decision making
  • Always rule out the worst case scenario
  • Assume that artifacts are the last explanation for changes in critical values

• Anchoring Bias
  • Regard conflicting data as evidence of the need to continue to seek the true diagnosis rather than as anomalies to be disregarded.

Fioratou E, Anaesthesia. 2010
Questions?