

## The Art & Science of Clinical Problem-Solving

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## Patient Presentation



Your 72-year-old mother calls complaining of sudden-onset difficulty breathing and chest pain for the last several hours. She was feeling fine during her recent vacation in Australia (she returned to Florida a few days ago) but noticed left thigh pain yesterday.

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## Patient Presentation, continued

- She denies fever, chills, or abdominal pain.
- Her chest only hurt when she took a breath
- She did not have enough frequent flier miles to upgrade to Business Class...

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## What's the Diagnosis?

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## Clinical Problem-Solving: Outline

- Pattern recognition
- Diagnostic error: Cognitive biases and heuristics
- How can we become better clinical problem-solvers?
- Case presentation

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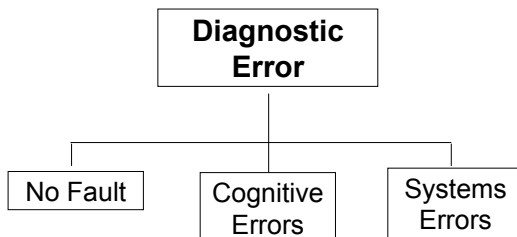
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(Graber, M. L. et al. Arch Intern Med 2005;165:1493-1499)

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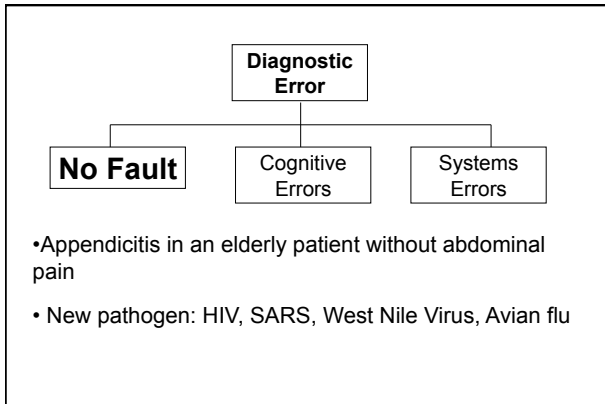
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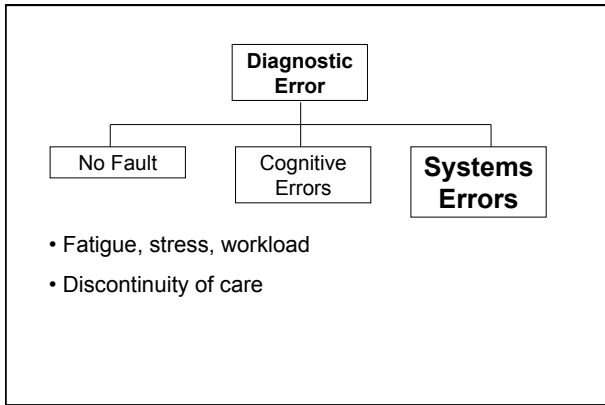
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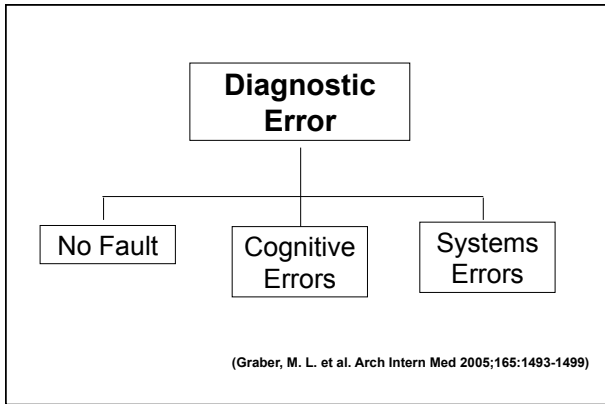
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**Diagnostic Error**

```

graph TD
    A[Diagnostic Error] --> B[No Fault]
    A --> C[Cognitive Errors]
    A --> D[Systems Errors]
    
```

1. Poor knowledge

- Unaware of heparin-induced thrombocytopenia
- Unaware of Fournier's gangrene

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**Diagnostic Error**

```

graph TD
    A[Diagnostic Error] --> B[No Fault]
    A --> C[Cognitive Errors]
    A --> D[Systems Errors]
    
```

2. Incomplete data gathering

- Didn't consider endocarditis due to a brief cardiac exam
- Didn't consider the correct diagnosis because did not obtain a complete history

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**Question for the Audience**

- When comparing the relative value of the history, exam, and labs in making medical diagnoses, studies reveal that the correct diagnosis is determined after only history in what percent of patients?

A) 20% or less of the time  
 B) Between 20% and 70% of the time  
 C) Above 70% of the time  
 D) Not sure: I no longer waste time obtaining a history

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## History is The Key

- 6 decades ago: the correct diagnosis can be made after history-taking alone in 74% of patients  
*(Platt R. Manchester University Medical School Gazette 1947; 27:139-145)*
- Comparing the relative value of history, exam, and labs in making medical diagnoses: correct diagnosis determined after only history in 82% of patients  
*(Hampton JR, Br Med J 1975;2:486-489)*
- In 1992, Petersen reproduced the above study: found that the history led to the correct diagnosis 76% of the time  
*(Peterson MC, West J Med 1992;156:163-165)*

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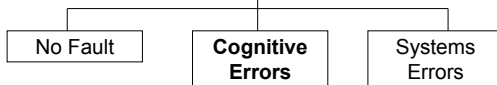
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## Diagnostic Error



3. Succumbed to a cognitive bias
  - Availability bias
  - Anchoring bias
  - Premature closure
  - Framing

*(Kassirer and Kopelman. Learning Clinical Reasoning. 1991)  
(Gurpreet Dhalwal in Clinical Problem-Solving. 2006)*

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## Availability Bias

- Judge probability by ease of recall
- Humans remember the remarkable or unusual
- If sued re: missing dissection, every pt with chest pain has dissection until proven otherwise
- Specialists also susceptible

*(Gulati et al. "Impatient Inpatient Care" N Engl J Med 2000)*



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### Anchoring Bias

- Fall in love with the first diagnosis



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### Anchoring Bias: Classic Example

Randomized trial:

- a) What does  $8 \times 7 \times 6 \times 5 \times 4 \times 3 \times 2 \times 1 = ?$
- b) What does  $1 \times 2 \times 3 \times 4 \times 5 \times 6 \times 7 \times 8 = ?$

Answers:

- a)
- b)

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### Anchoring Bias

- Fall in love with the first diagnosis
- Medical example: admitting a patient already worked up in the Emergency Room



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### Premature Closure

- Tendency to stop considering other possibilities once you have reached a diagnosis
- We see what we are looking for (*confirmation bias*)
  - ✓ Focus on the supporting data
  - ✓ Dismiss the conflicting data
- Label persistent GI symptoms as refractory IBD and proceed with colectomy without ruling out .....

(C Goulet et al. "The Unturned Stone" N Engl J Med 2005)

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### Framing

- Framing effect: a different conclusion drawn from the same set of facts, depending on how the facts are presented
- Some believe that humans tend to be "cognitive misers" preferring to do as little thinking as possible
- "Frames" provide people a quick way to process information

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### Framing

- 82-year-old man with mild dementia and aortic stenosis brought to the ED by his daughter with several weeks of anorexia, weight loss, subjective fever, and malaise.
- The ED doc calls up the admission:

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## Cognitive Errors

- ✓ Availability
- ✓ Anchoring
- ✓ Premature Closure
- ✓ Framing Effects

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## Clinical Problem-Solving: Outline

- ✓Pattern recognition: The example of PE
- ✓Diagnostic error: Cognitive biases and heuristics
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## Reducing Cognitive Errors

1. Acknowledge
2. Metacognition

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## Acknowledge

- Overall, physicians do an excellent job
- Errors are common... so is overconfidence

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## Metacognition

- Thinking about one's thinking
- Monitoring one's own cognitive processes
- Becoming aware of the different types of cognitive errors



*(Croskerry P. Ann Emerg Med 2003)*

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## Metacognition

- Recognize the situations where errors occur:
  - When feeling rushed
  - When the patient was evaluated by someone else
- Operationalizing metacognition: "Prospective hindsight"
  - Assume that your working diagnosis is wrong: "What else could this be?"

*(Mitchell et al. J Behav Decis Making 1989)*

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## Reducing Cognitive Errors

- ✓ Acknowledge
- ✓ Metacognition

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## Conclusions

- Clinical problem-solving is an *essential* function of the physician
- Pattern recognition works well for some diagnoses
- Cognitive errors are common
- We can (hopefully) become better problem-solvers!

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## Clinical Problem-Solving: Outline

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**Clinical Problem-Solving Exercise**

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*Thank you!*

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