Teaching Fast and Slow: A Framework and Toolkit for Clinical Reasoning Development on the Wards

Part 1

Introductions

- [insert your name, title and qualifications here]

Objectives

- Review a key model and major terminology used to conceptualize clinical reasoning

- Utilize a framework to identify learners with clinical reasoning deficits

- Implement strategies for identifying clinical reasoning deficits along key steps of the clinical reasoning process

Roadmap

Part 1

- **Understand** clinical reasoning
  - Dual process theory
  - Clinical reasoning process

- **Diagnose** clinical reasoning deficits
  - General approach to identifying biases and clinical reasoning deficits
  - Discuss how to best identify deficits at each step

Part 2

- **Treat** clinical reasoning deficits
  - General strategies
  - Targeted approach

Dear Program Director,

I am writing to express my concern about Jim, an intern on my team. It's been 2 weeks and he really seems to be struggling. Yesterday I assigned Jim a case of sepsis in a patient with multiple possible infectious sources. In sum, the patient was a 50-year old male with a history of IVDA and ESRD who presented with subacute onset fevers and was found to have sepsis, a new holosystolic murmur and Osler's nodes on exam.

I thought this was a great patient for my intern and I was excited about the possibility of hearing a wonderful, extensive, prioritized, thesis-driven differential. When Jim came back to go over his presentation, his history was disorganized and incomplete. He failed to include pertinent information on his physical exam. In addition, Jim's assessment was completely off the mark since he thought the patient's presentation was consistent with pneumonia. Please advise...

Sincerely,

--Exasperated attending

UNDERSTAND:

Dual Process Theory for Clinical Reasoning

Case 1

50-year old man with a history of IVDA and ESRD who presented with subacute onset fevers and was found to have sepsis, a new holosystolic murmur and Osler's nodes on exam.
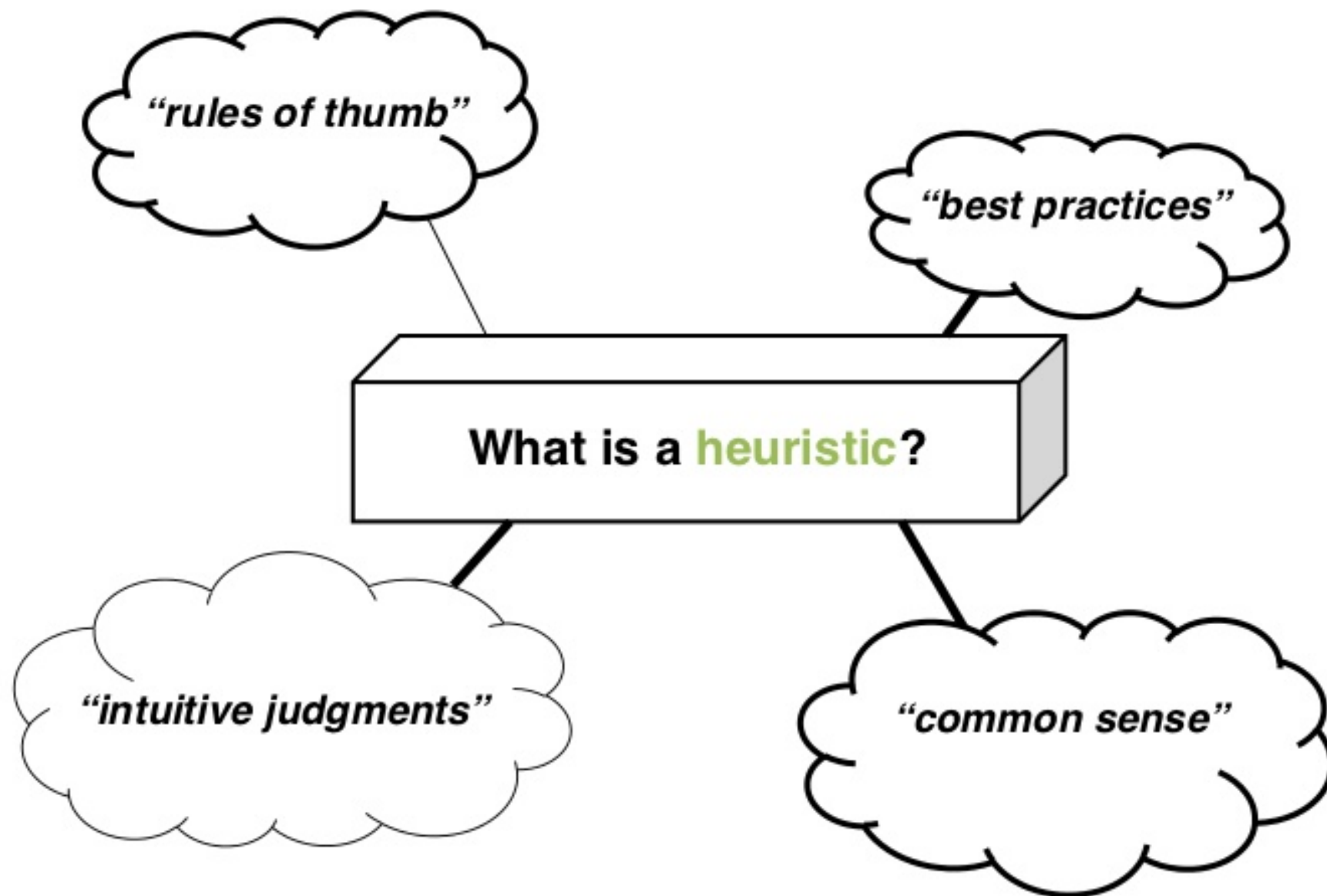

What's going on?

Case 2

50-year old man who presents with malaise and arthralgias found to have fevers and tachycardia
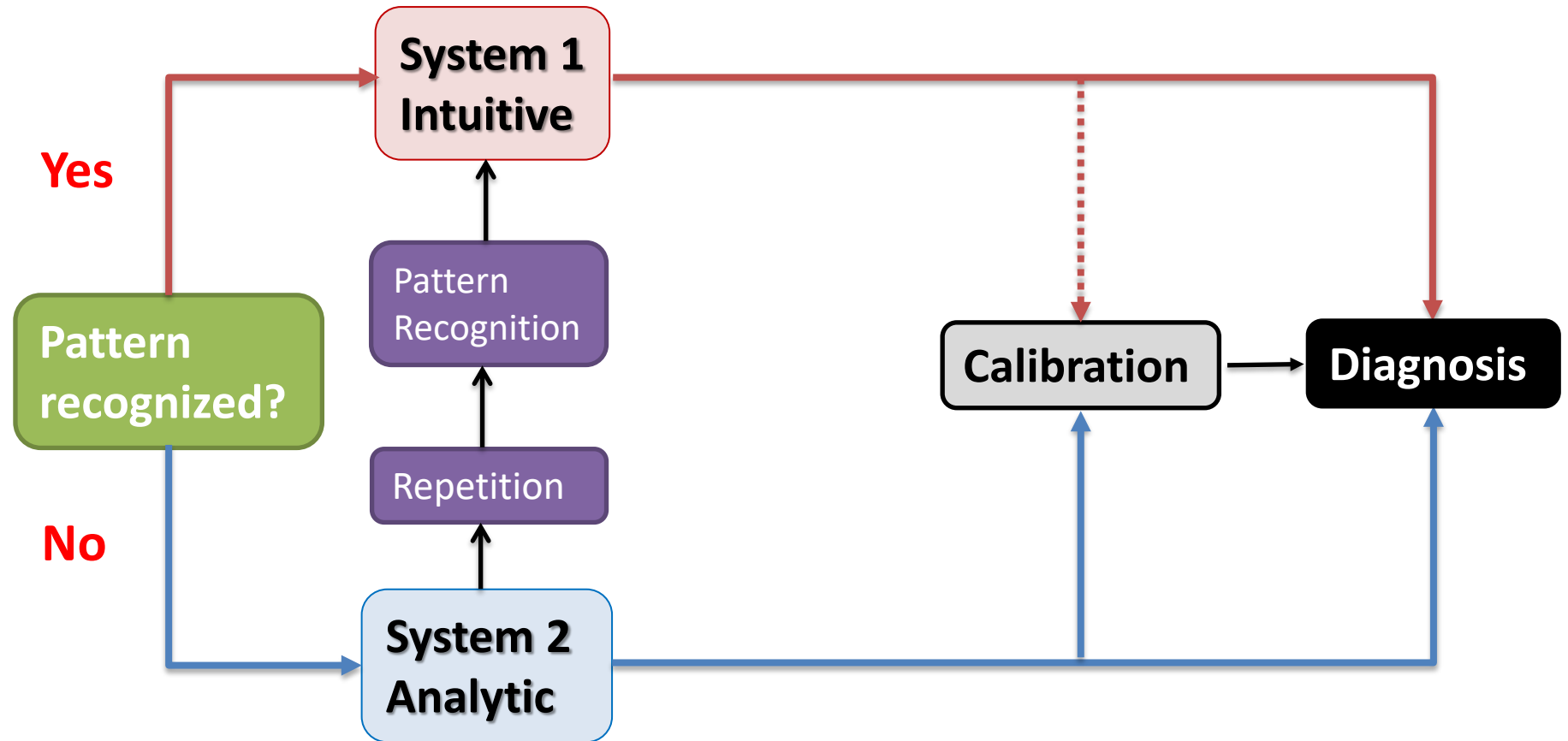
What's going on?

Dual Process Theory

Dual Process Theory

System 1

- Intuitive
- Fast/automatic
- Low cognitive effort
- More errors
- Emotional
  - Impulses
  - Habits
  - Heuristics

System 2

- Analytic
- Slow/effortful
- High cognitive effort
- Fewer errors
- Logical
  - Reflection
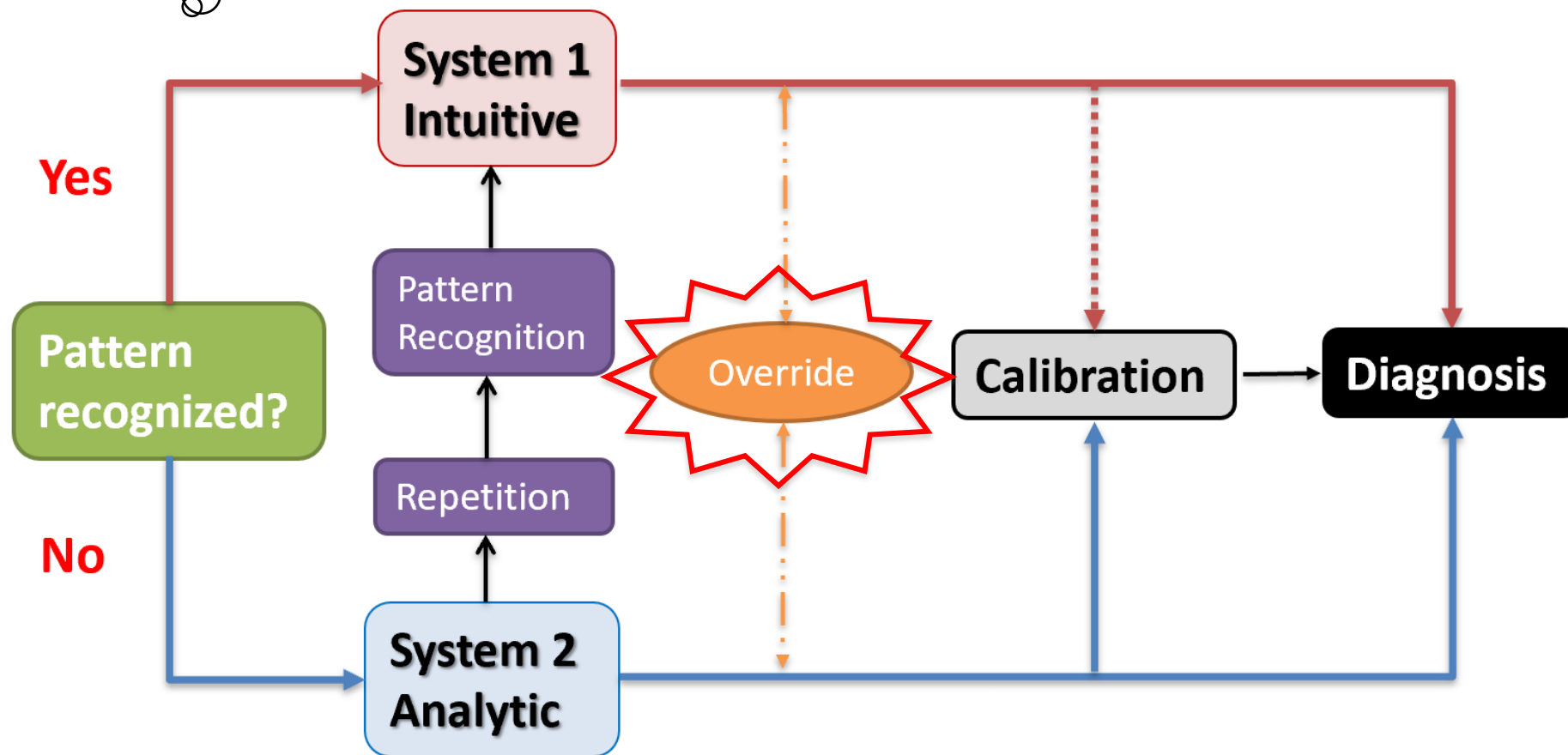 - Planning
  - Problem solving

Tired? Busy?
Cognitive Biases?
Systems Errors?
Case too easy/difficult?

Introduction

Understand

Diagnose

Treat

Conclusion

System 1 Intuitive

Yes

Pattern recognized?

Pattern Recognition

Override

Calibration

Diagnosis

Repetition

No
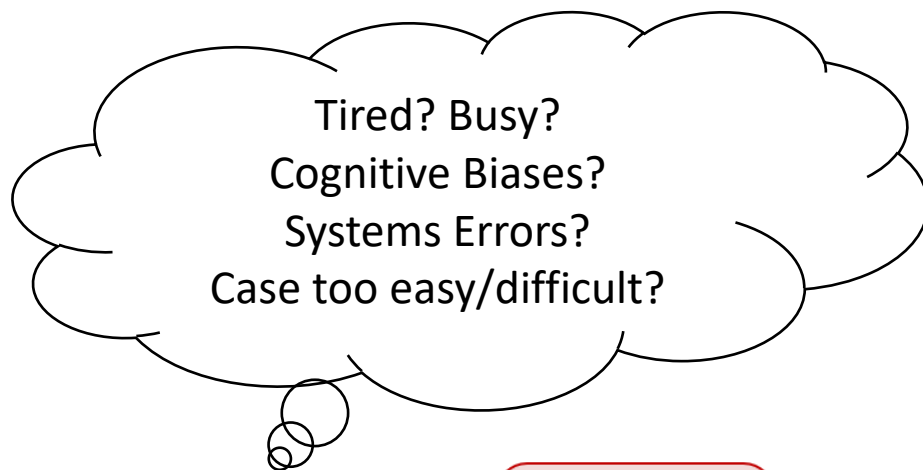
System 2 Analytic

Take Home Message

- Combining system 1 and system 2 reasoning is usually better than using either alone

  - GOAL: Use strategies to activate analytical (system 2) reasoning in your learners when needed

Dual Process Theory

UNDERSTAND:
The Clinical Reasoning Process

Key Elements in Clinical Reasoning

Knowledge

Context

Experience

Patient's story

Data acquisition

Accurate "problem representation"

Generation of hypothesis

Search for and selection of illness script

Diagnosis

Adapted from Bowen, NEJM 2006
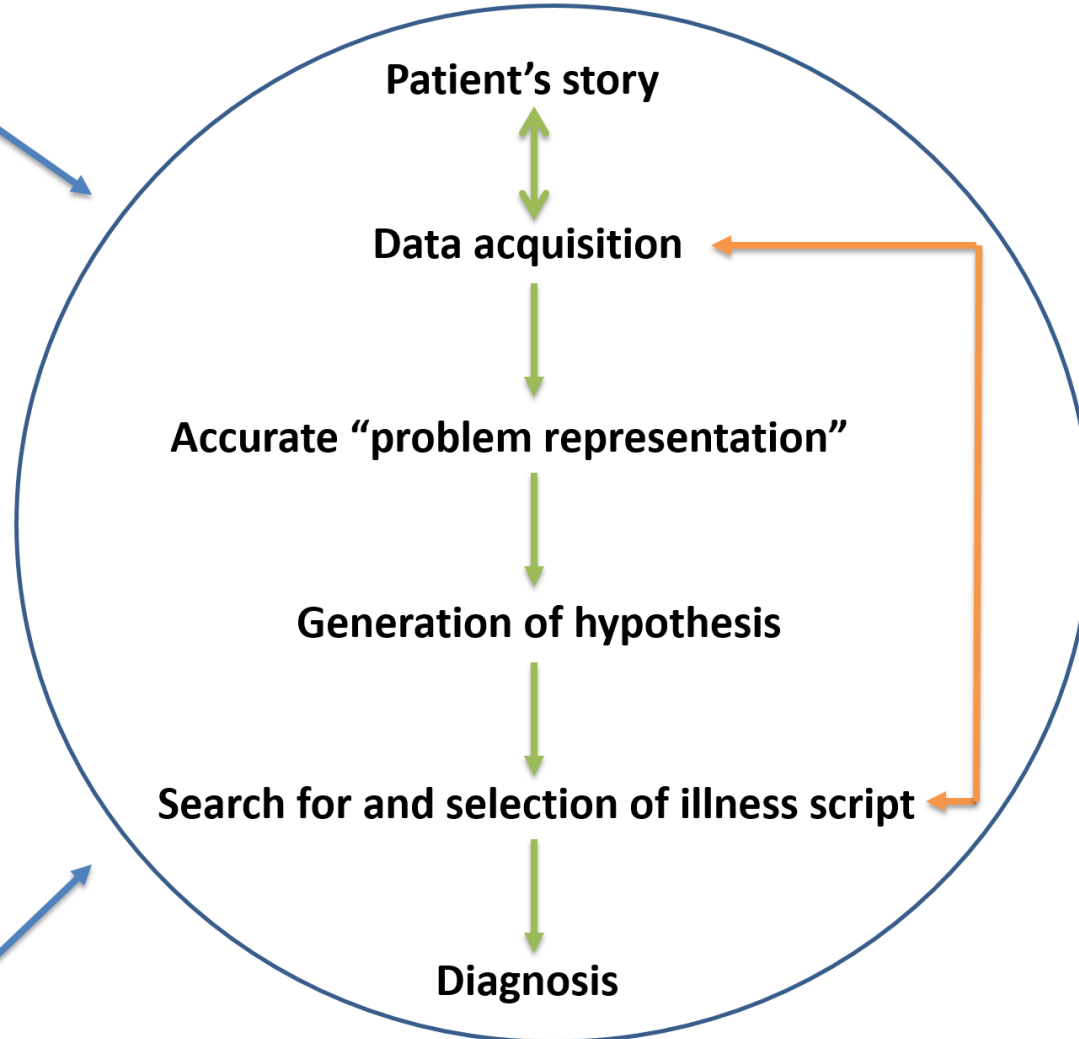
Problem Representation

- The characterization (or transformation) of a patient's problems into abstract terms

- Learner must synthesize the history and data into a cohesive summary statement

Painful, swollen right knee that began two nights ago with attacks two and nine years ago

Acute, recurrent attack of abrupt, nocturnal severe pain in a large joint monoarthritis

Illness Script

|	EPIDEMIOLOGY	TIME COURSE	TYPICAL FEATURES	MECHANISM OF ILLNESS
	Who gets this disease?	How does it present in time?	What are the classic signs and symptoms?	Biomedical cause
PE	Risk factors: malignancy, OCP use, immobility, long trips	Usually acute onset	Pleuritic chest pain, SOB, hypoxia, unilateral LE swelling, tachycardia	
Condition #2				
Condition #3				

Introduction

Understand

Diagnose

Treat

Conclusion

Cognitive Biases
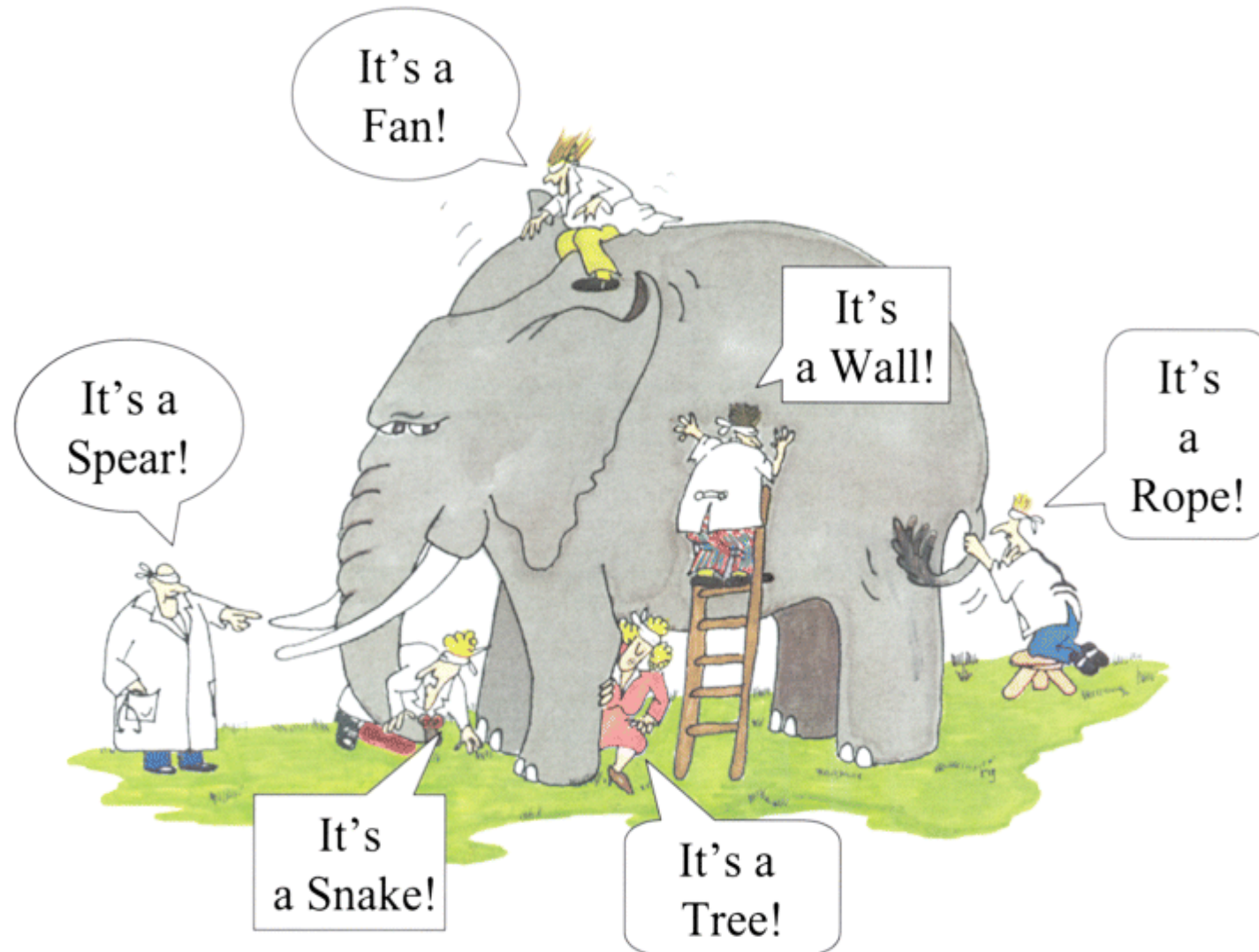
Anchoring Bias

- Also called "**premature closure**"

- The failure to continue considering reasonable alternatives after a primary diagnosis is reached, is the most common diagnostic error

- *When the diagnosis is made, the thinking stops*

Availability and Confirmation Bias

- **Availability bias**
  - Judge things as being more likely if they readily come to mind

- **Confirmation bias**
  - Tendency to look for confirming evidence to support a diagnosis rather than look for discomfirming evidence to refute it (despite the latter often being more persuasive and definitive)

Diagnosis Momentum

- Also known as "chart-lore"
- Once diagnostic labels are attached to patients, they become stickier and stickier

Visceral Bias

- Counter-transference
- Negative feelings towards a patient may result in diagnoses being missed
- Common Types
  - Non-adherent patients
  - Homeless patients
  - Patients with chronic pain
  - Obese patients

Unpacking Principle

- Failure to elicit all relevant information to establish a diagnosis
  - i.e. a package is handed to you and you don't unwrap it

Additional Cognitive Biases

- **Blind obedience**: showing undue deference to authority or technology

- **Overconfidence**: universal tendency to believe we know more than we do

Key Elements in Clinical Reasoning

Introduction

Understand

Diagnose

Treat

Conclusion

Knowledge

Context
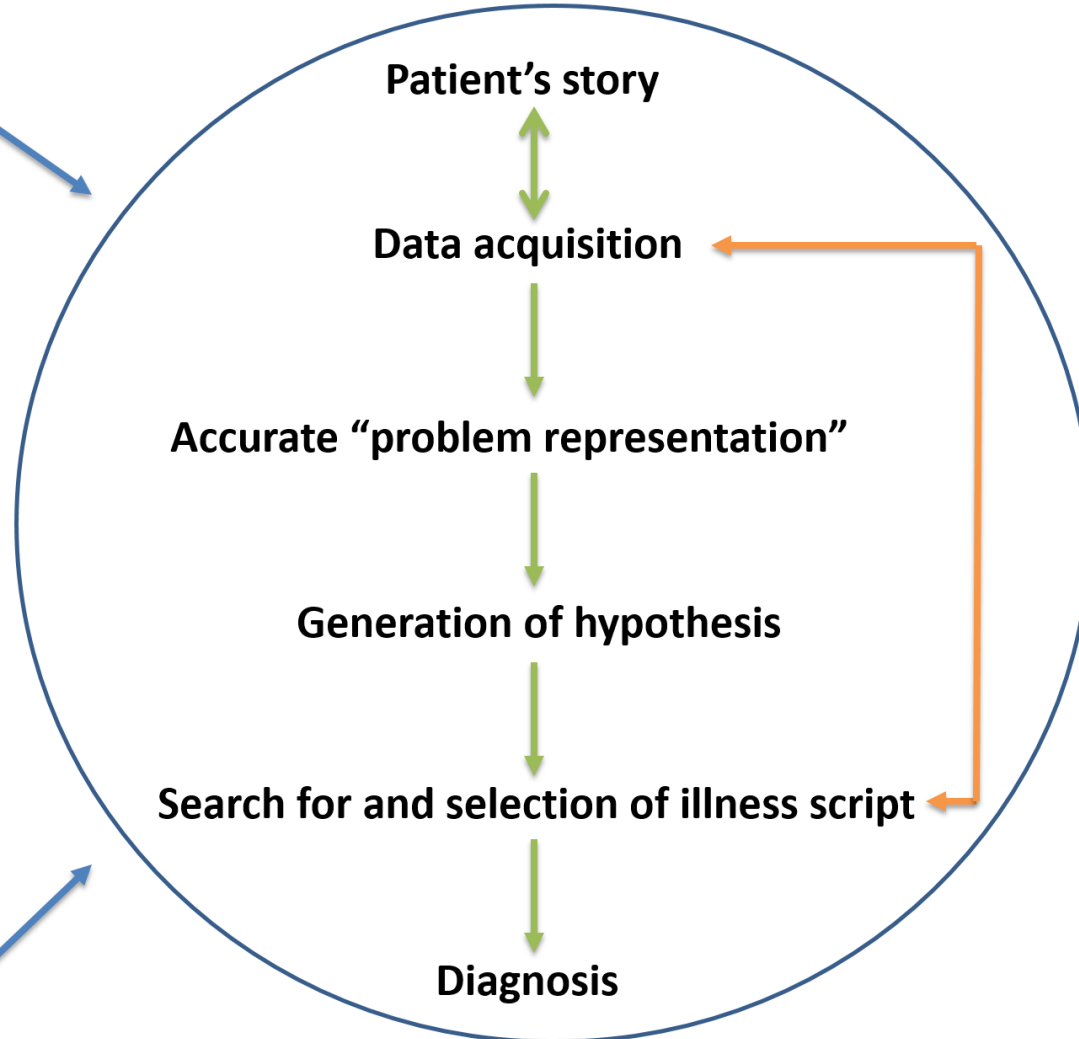
Experience

Patient's story

Data acquisition

Accurate "problem representation"

Generation of hypothesis

Search for and selection of illness script

Diagnosis

Adapted from Bowen, NEJM 2006

Key Elements in Clinical Reasoning

Introduction

Understand

Diagnose

Treat

Conclusion

Data Collection

Hypothesis generation

Problem representation

ILLNESS SCRIPT KNOWLEDGE

Script selection (diagnosis)

Treatment

Rendon, The Hospitalist 2015

Key Elements in Clinical Reasoning

Introduction

Understand

Diagnose

Treat

Conclusion

Data Acquisition and Hypothesis Generation

Problem Representation

Illness Script Selection; Diagnosis and Treatment

Adapted from Rendon, The Hospitalist 2015 and Bowen, NEJM 2006
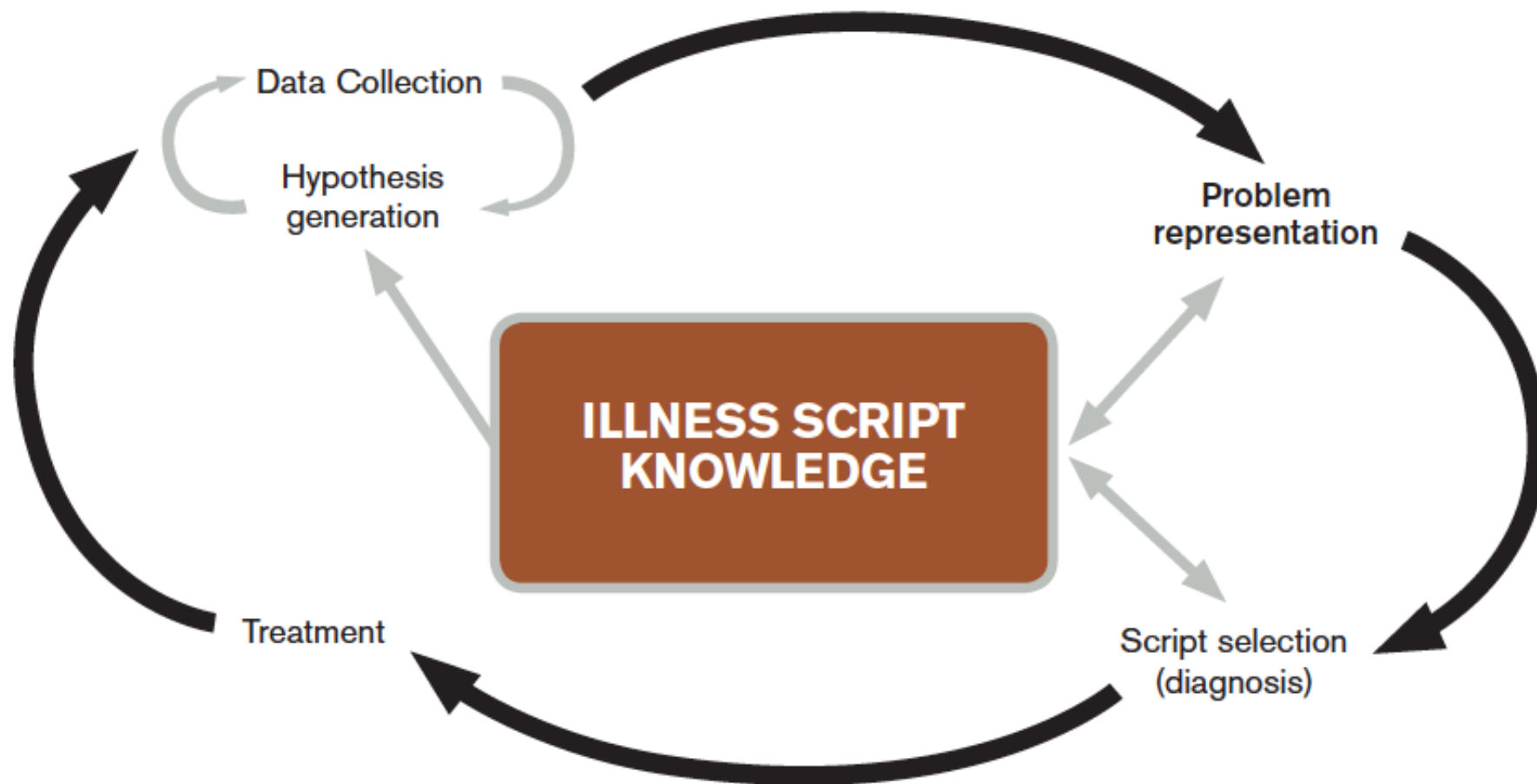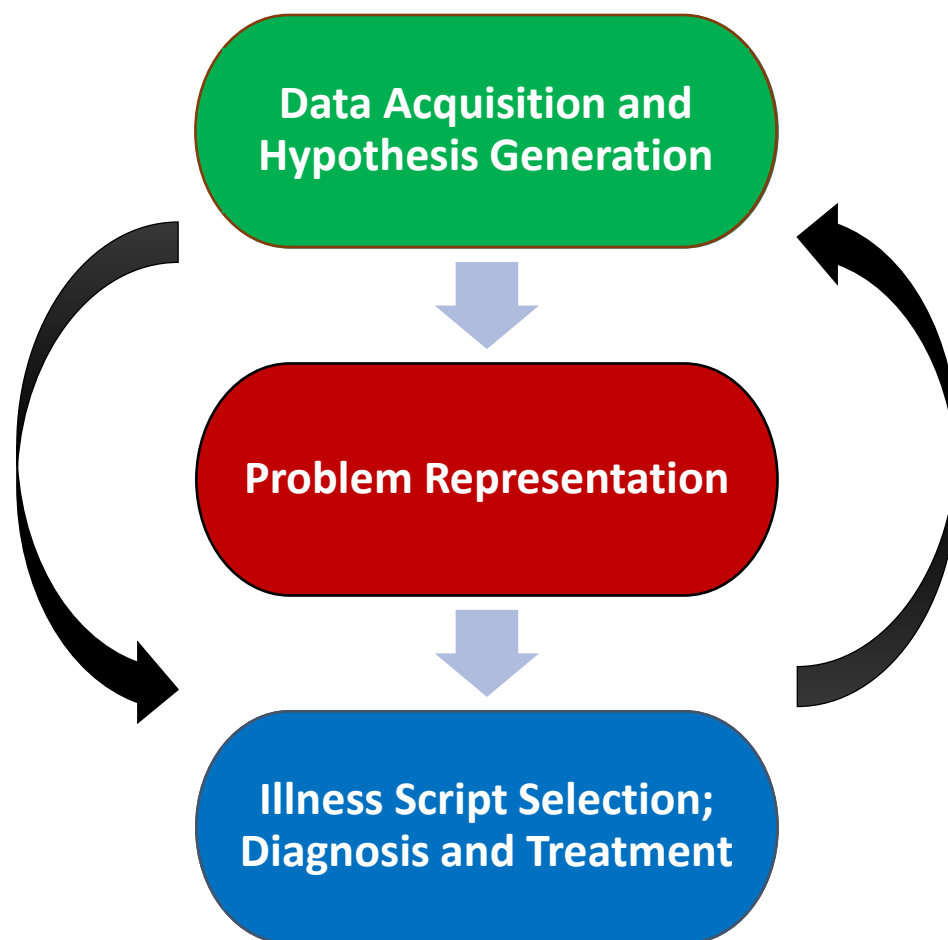
Diagnosing Clinical Reasoning Deficits: Look for Clues

- **Direct supervision**
  - direct observation of patient encounter

- **Indirect supervision**
  - during rounds
  - outside of rounds

- **Medical chart review**
  - progress notes
  - discharge summaries
  - sign-outs

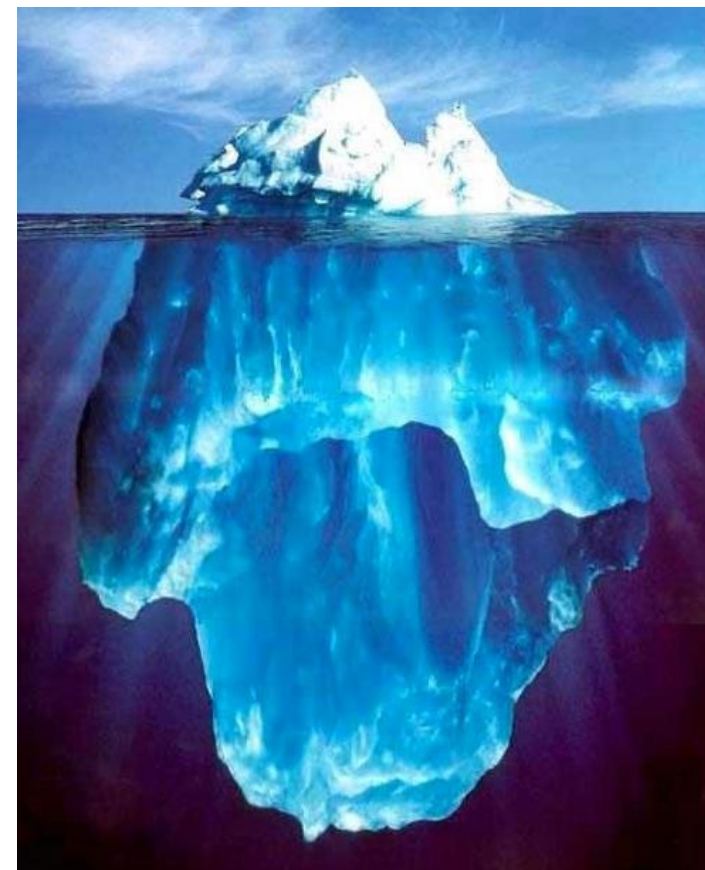# Diagnosing Clinical Reasoning Deficits: Get to the Root of the Problem

- Lack of knowledge?

- Inexperience?

- Disorganized thinking?

- Cognitive biases?

- Lack of motivation?

- Other

Small Group Activity #1: Diagnosis

- Each handout asks you to focus on one of the three clinical reasoning deficits:
  - Data acquisition/hypothesis generation
  - Problem representation
  - Illness script selection; diagnosis and treatment

- For your respective reasoning deficit:
  - What clues can you identify in the presentation that suggest a clinical reasoning deficit is present?
  - What cognitive biases did Jim exhibit?
  - What questions can you ask Jim to help you localize the clinical reasoning deficit?

Jim's History

50 yo w/ man with a h/o COPD, DM, HTN, ESRD on MWF HD and GERD here with fevers. The patient states the fevers have been going on for 5 days. The patient reports feeling malaise for 8 days. He had a mild cough 3 weeks ago. He stated the cough was nonproductive. He reports sore throat but denies any associated rhinorrhea or congestion. He denies any sick contacts, SOB or night sweats. He had fevers but no chills, nausea, vomiting or chest pain.   He denies any rashes or photosensitivity. He also denies trips to wooded areas, neck stiffness or confusion.

In the ED, VS: T 102, HR 110, BP 90/60 RR 22, O2 sat 97% on RA. CXR showed multiple small infiltrates. The patient was started on vancomycin and cefepime and was subsequently admitted for further evaluation.

Jim's PMH, PE and Labs

- **PMH** – ESRD on MWF HD, DM, HTN, COPD, GERD
- **Family hx** – non-contributory
- **Social hx** – uses cocaine and heroin, drinks 2 beers/week
- **Meds** – insulin, amlodipine, albuterol inhaler, omeprazole

- VS: see HPI
- Gen: NAD
- HEENT: PERRLA, no neck stiffness
- CV: 3/6 systolic murmur
- Lungs: CTAB
- GI: soft, NTTP
- Ext: no c/c/e

- Na 130, K 4, CO2 22, BUN 30, Cr 3.0
- WBC 16, Hgb 8, Plt 150
- LFTs WNL
- Coags WNL
- CXR: multiple small infiltrates on CXR (preliminary read)
- EKG: normal sinus rhythm

Jim's Summary Statement

Introduction

Understand

Diagnose

Treat

Conclusion

50 yo w/ man h/o COPD, DM, HTN, ESRD on MWF HD and GERD here w/ cough, fevers, malaise, leukocytosis, tachypnea and pulmonary infiltrates on CXR likely secondary to pneumonia.

Jim's Assessment and Plan

Fevers

- *Likely infectious since WBC 22,000.*
- *Likely 2/2 pneumonia versus viral infxn. Bacteremia, UTI, osteomyelitis and lupus also on differential.*
- *Patient complained of cough 3 wks ago; CXR showed e/o multiple infiltrates.*
- *continue vancomycin, cefepime and gentle IVF bolus*
- *follow up with blood cultures, consider viral infection*

Leukocytosis

- *Likely infectious. Suspect 2/2 pneumonia or viral URI given CXR findings*
- *treat with antibiotics as above*

Tachypnea

- *Likely secondary to pneumonia*
- *treat with antibiotics as above*

ESRD

- *Continue MWF HD via AVF*

Murmur

- *likely flow murmur in s/o infection. Should improve with IVFs and Abx*

IVDA

- *recommend outpatient counseling; avoid narcotics*

Small Group Activity #1: Debrief

- Each handout asks you to focus on one of the three clinical reasoning deficits:
  - Data acquisition/hypothesis generation
  - Problem representation
  - Illness script selection; diagnosis and treatment

- For your respective reasoning deficit:
  - What clues were present in the case presentation?
  - What cognitive biases did Jim exhibit?
  - What questions can you ask the learner to help you localize the clinical reasoning deficit?

Problem Area: Data Acquisition and Hypothesis Generation

- **Clues**
  - Disorganized HPI
  - Missing pertinent positives/negatives
  - Looks for only confirmatory information
  - Fails to explore information that could alter diagnostic hypothesis

- **Cognitive Biases**
  - Confirmation bias
  - Diagnosis momentum
  - Framing effect

- **Questions**
  - **"What were your initial thoughts when the patient gave you the chief complaint?"**
  - **"What should you think of when the patient tells you that he was having symptom X?"**
  - **"What alternative diagnoses did you consider?"**

Problem Area: Problem Representation

- **Clues**
  - No lead diagnosis obvious from HPI
  - Summary statement includes irrelevant information (or excludes relevant information)
  - Summary statement does not use semantic qualifiers
  - Story does not give the team a "sense of the patient"
  - Notes lack synthesis of information

- **Cognitive Biases**
  - Anchoring bias
  - Representative restraint

- **Questions**
  - **"Can you summarize the HPI in 2-3 sentences?"**
  - **"How does the patient's current complaint fit into his past history?"**

Problem Area: Illness Script Selection and Diagnosis

- **Clues**
  - Lack of pertinent positives/negatives showcasing learner's compare/contrast strategies
  - Lack of differential diagnosis or lack of prioritization in differential ("shotgun approach" to differential for symptom)

- **Cognitive Biases**
  - Unpacking principle, availability bias
  - Confirmation bias, premature closure, visceral bias

- **Questions**
  - "Why did you pick this diagnosis as most likely?"
  - "What made you explore this one aspect in so much detail?"
  - "What other diagnoses did you consider? Why did you decide against them?"

Take Home Points

Introduction

Understand

Diagnose

Treat

Conclusion

Understand

Dual Process Theory

↓

Cognitive Biases

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Clinical Reasoning Process

Diagnose

Look for clues

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Directly observe learner

↓

Ask targeted questions

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Introduction

Understand

Diagnose

Treat

Conclusion