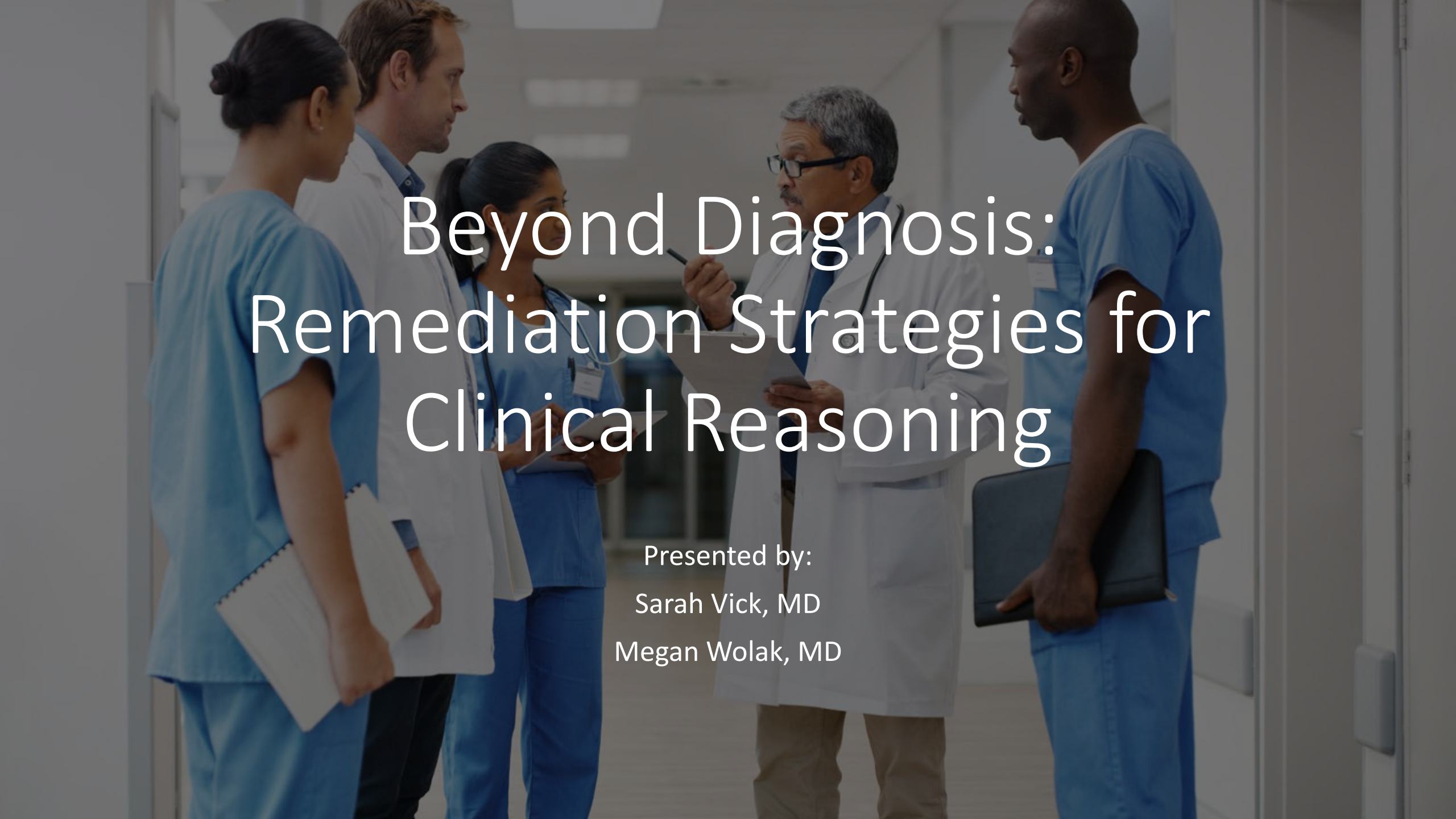


Beyond Diagnosis: Remediation Strategies for Clinical Reasoning

Presented by:

Sarah Vick, MD

Megan Wolak, MD

Objectives

- Diagnose the clinical reasoning domain of concern
- Develop remediation strategies based on domain
- Apply remediation framework to struggling learners

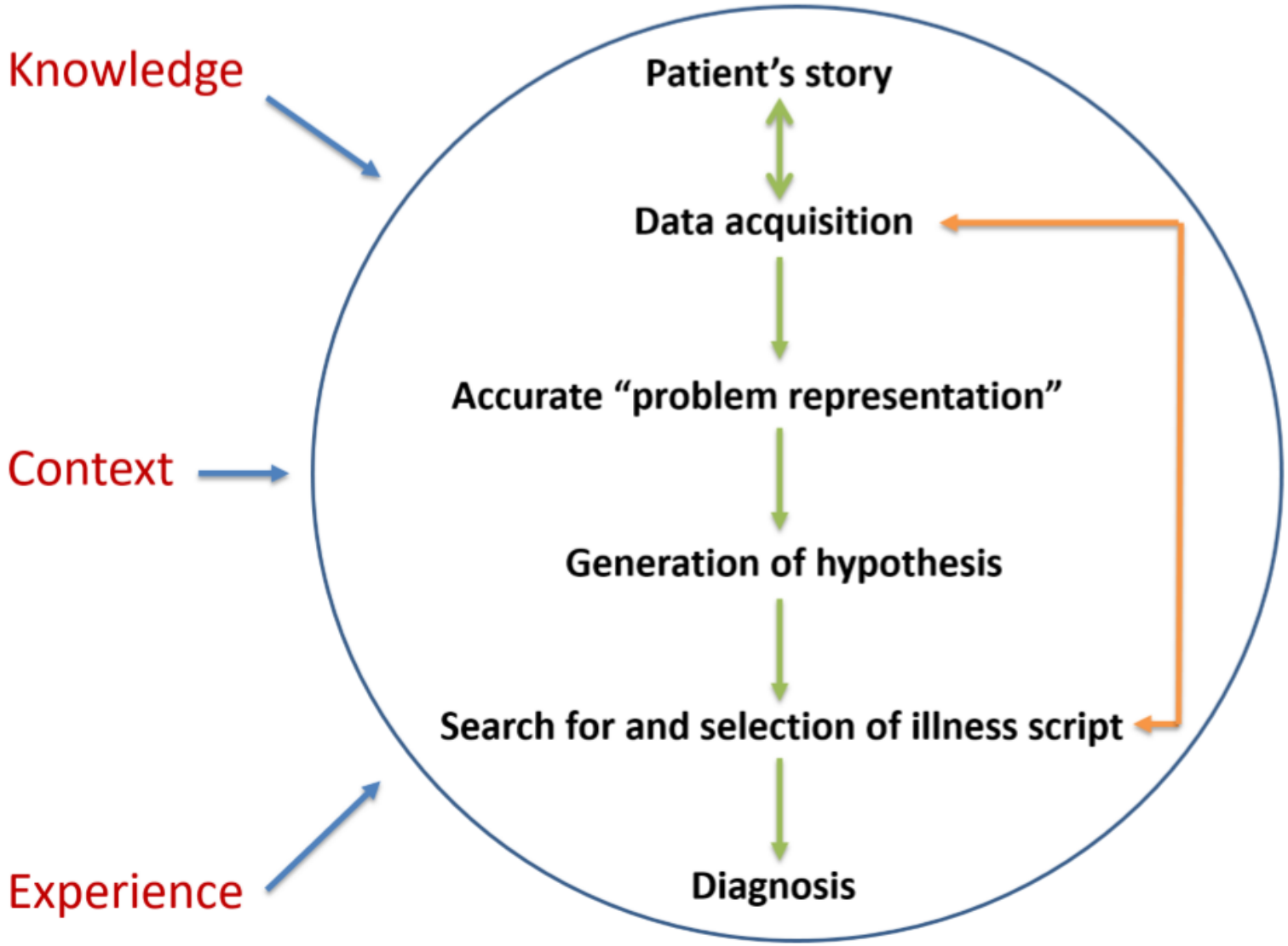
Starting 1st day with a new learner

Your colleague told you that this learner really struggles and good luck

"This learner is clueless. He never knows what is going on. His presentations are terrible. I am just done."

You are now left unsure of what to do next….

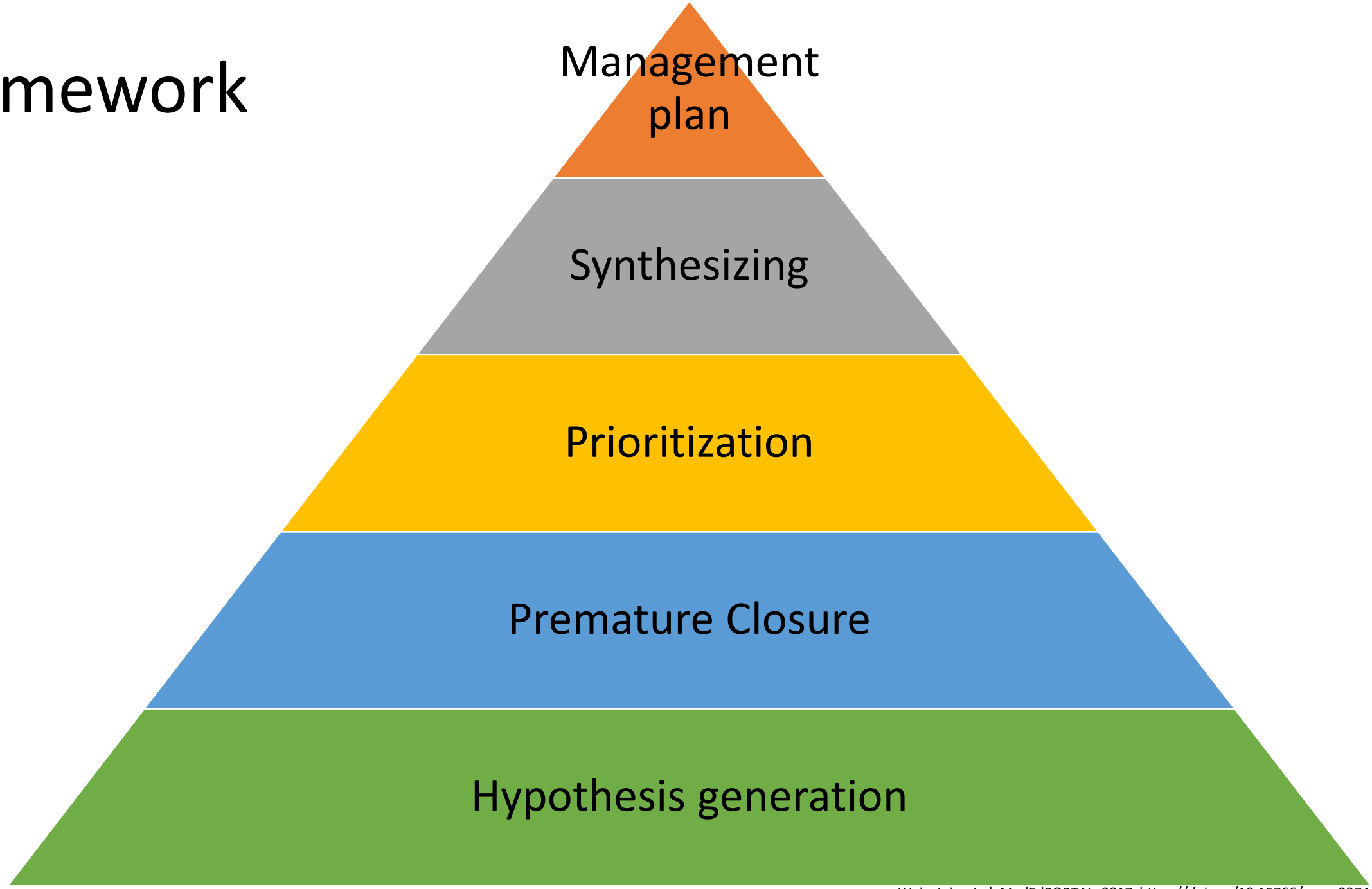
Key Elements in Clinical Reasoning



Adapted from Bowen, NEJM 2006

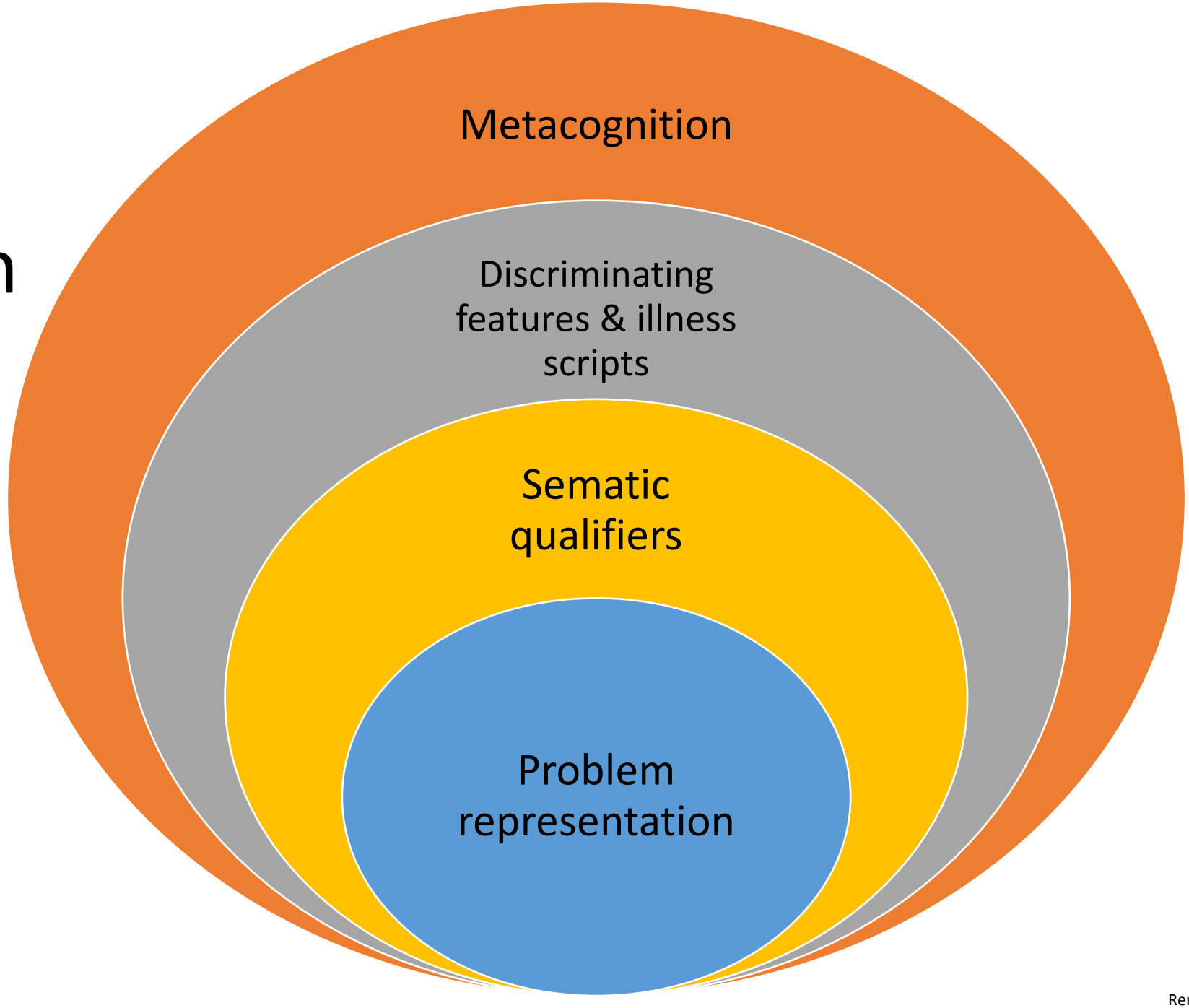
Case 1

Framework



Weinstein et al. MedEdPORTAL. 2017. https://doi.org/10.15766/mep_2374-8265.10650

Another common approach



Remediation in Medical Education. 2014

Major Symptoms	Primary Problem	Remediation Strategy
What is observed	Clinical reasoning deficit	Remediation Steps

Right Answer

≠

Right Reasoning

“Read More”

Knowledge Organization

So how do doctors think?

Exhaustive method

Gather every bit of data possible, don't miss a thing!

Then try to come up with a diagnosis

Pattern recognition

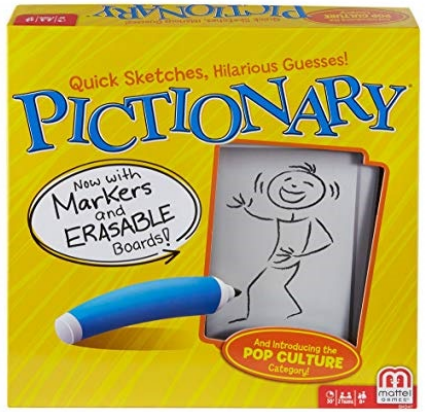
Know it when you see it--you've seen it before

Hypothesis generation

Propose an explanatory hypothesis--see if it "fits" the story.
Revise as you go along

Weinstein et al. MedEdPORTAL. 2017. https://doi.org/10.15766/mep_2374-8265.10650

Dual Process Theory



Yes

No

Pattern recognized?

System 1 Intuitive

Pattern Recognition

Repetition

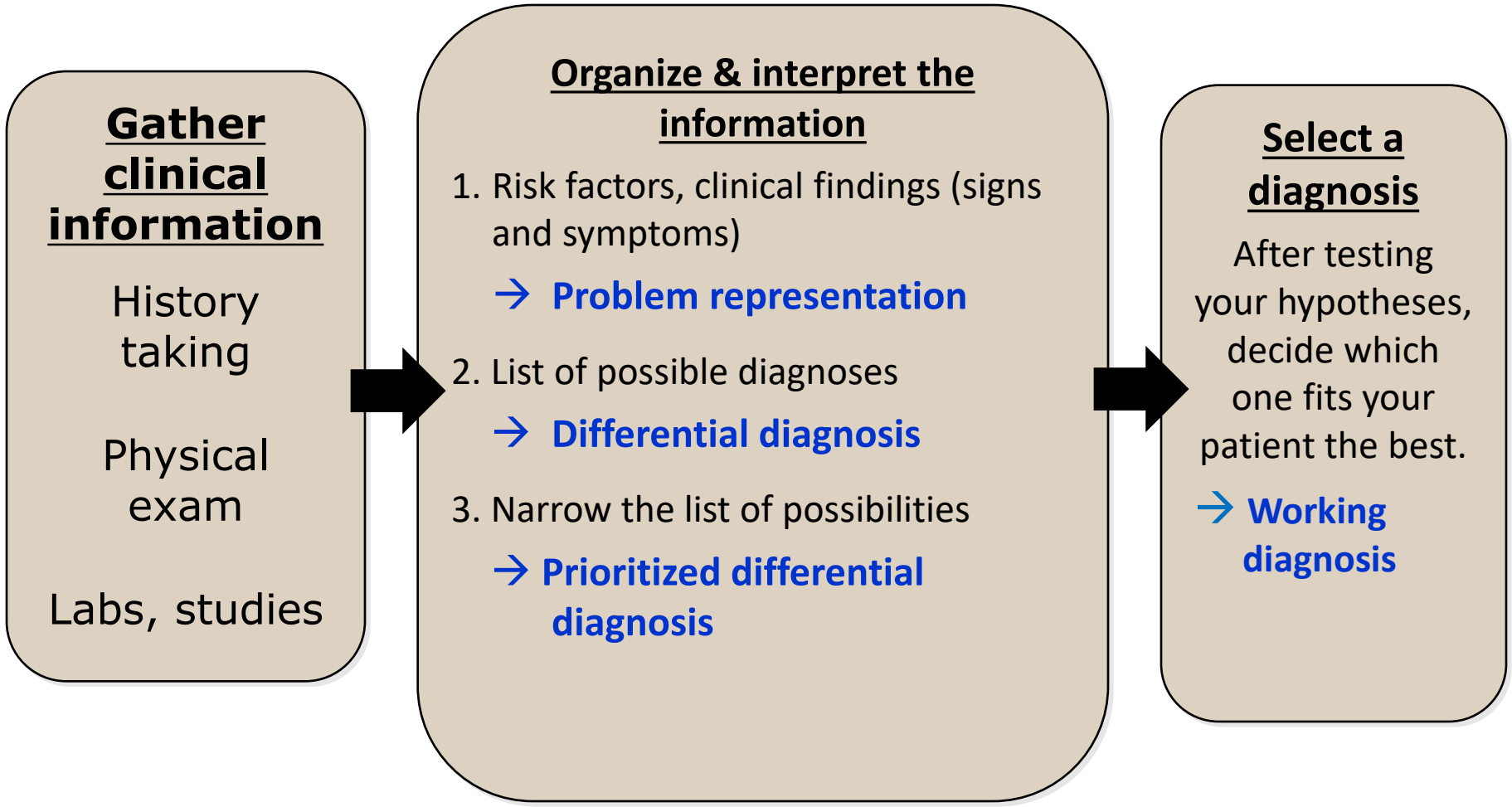
System 2 Analytic

Calibration

Diagnosis

Clinical Reasoning Process

From Symptoms to Diagnosis



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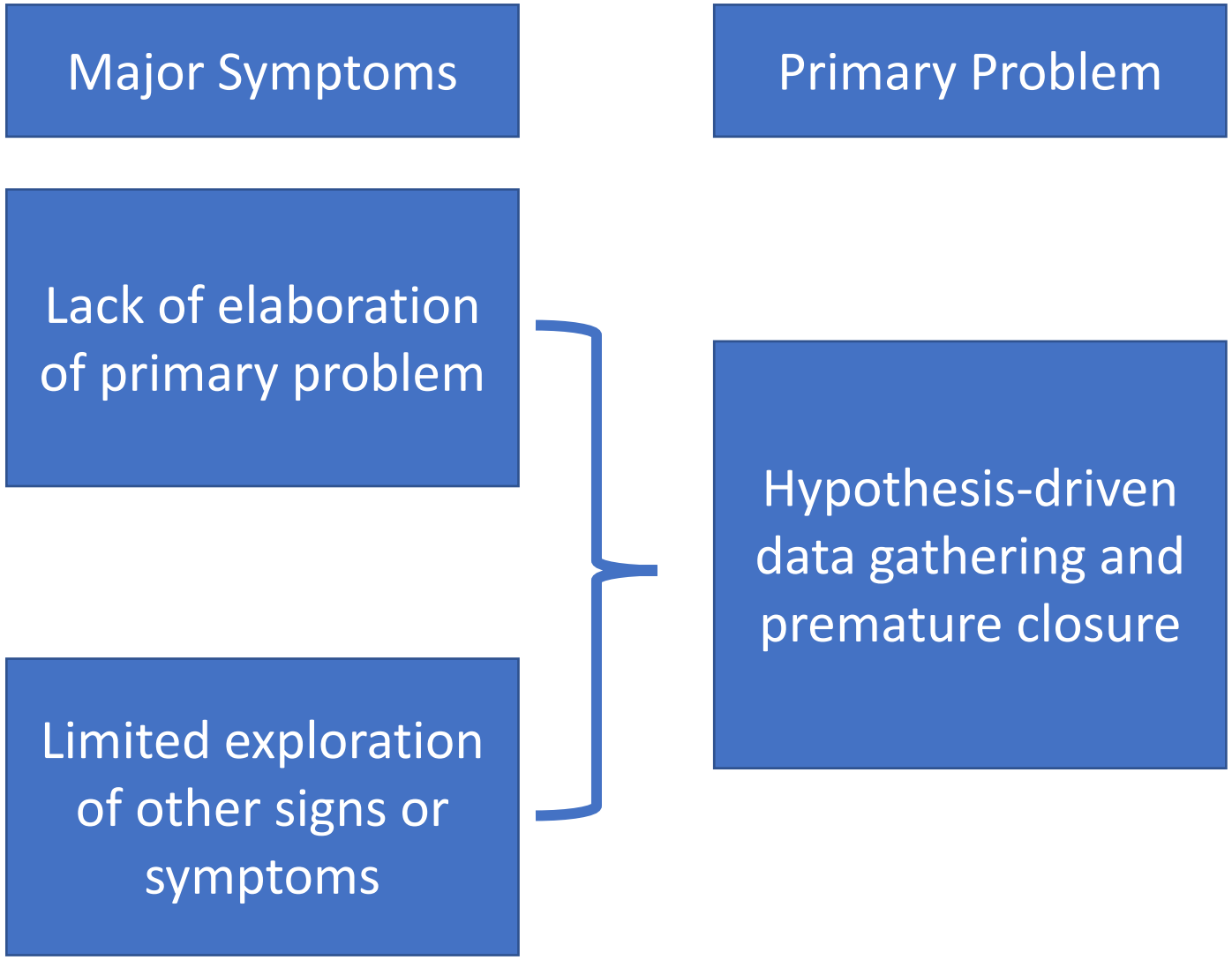
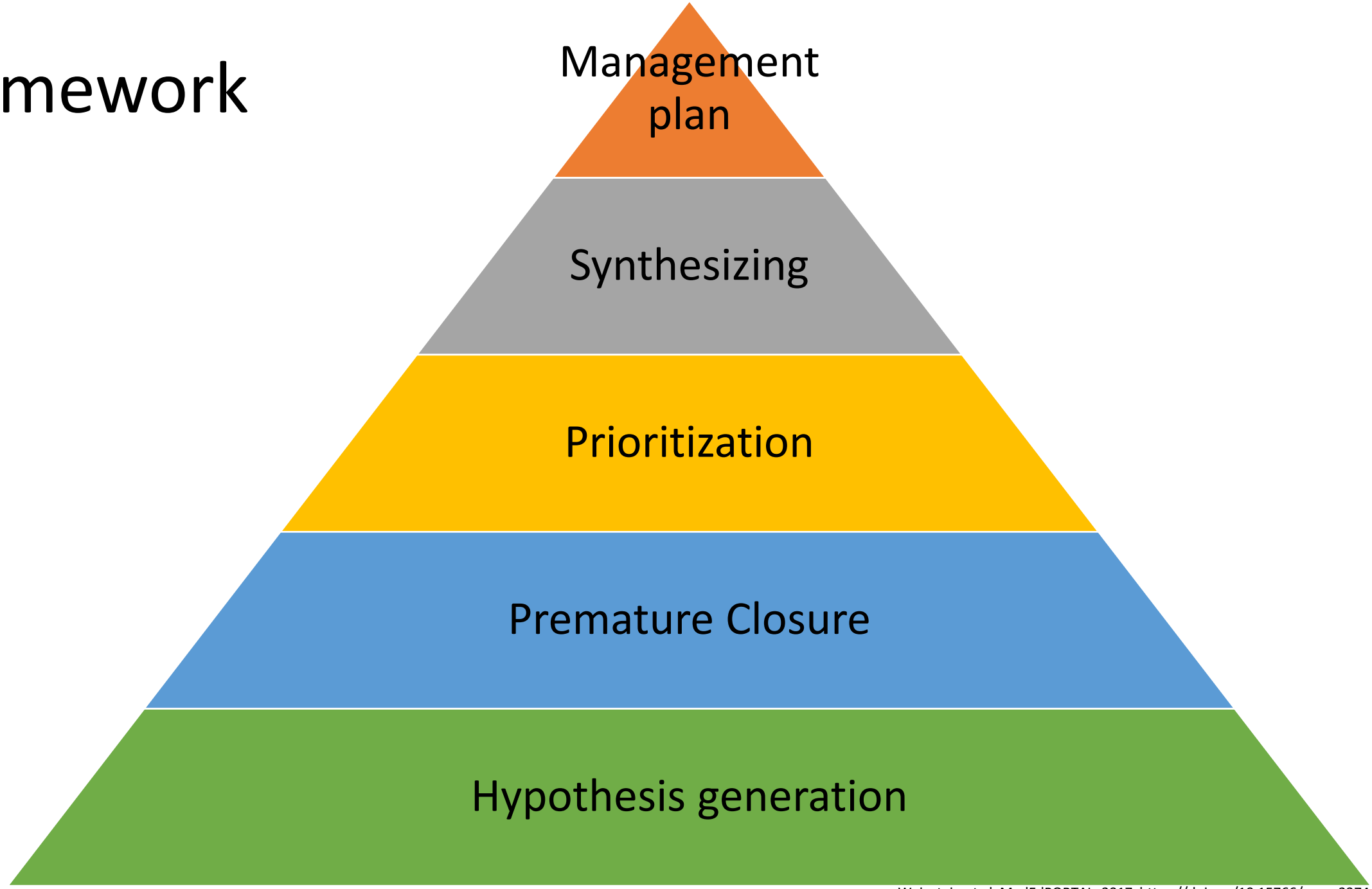

Major Symptoms
Primary Problem
Lack of elaboration of primary problem
Limited exploration of other signs or symptoms
Hypothesis-driven data gathering and premature closure

Framework



Weinstein et al. MedEdPORTAL. 2017. https://doi.org/10.15766/mep_2374-8265.10650

DX: hypothesis generation and premature closure

Tx: _____

REFILL 0 1 2 4 5 PRN

BP 190/89

38 yo man

At rest

PMH: HTN

Hypothesis?

New murmur

Che

Substernal

New onset

1 hour

Diaphoresis

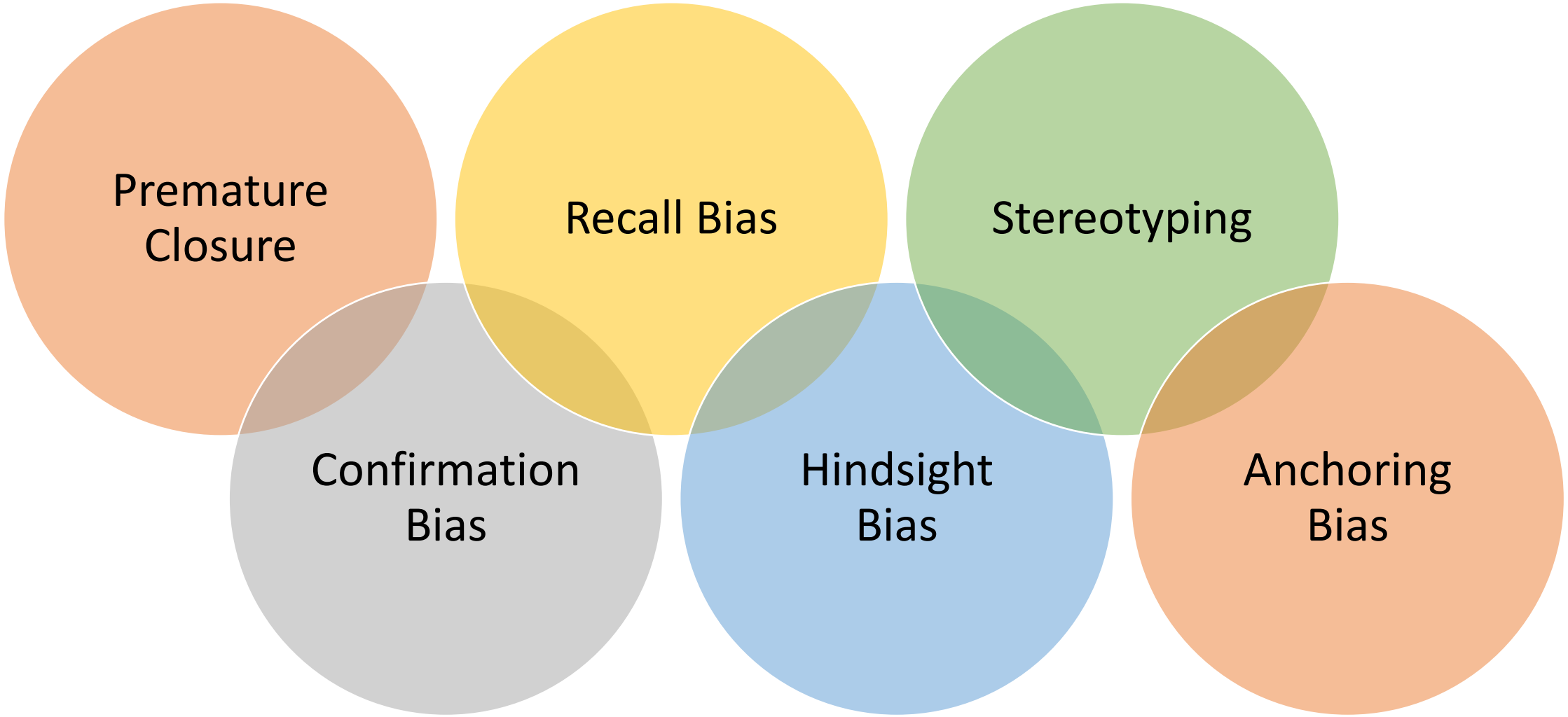
Lisinopril

1+ LE edema

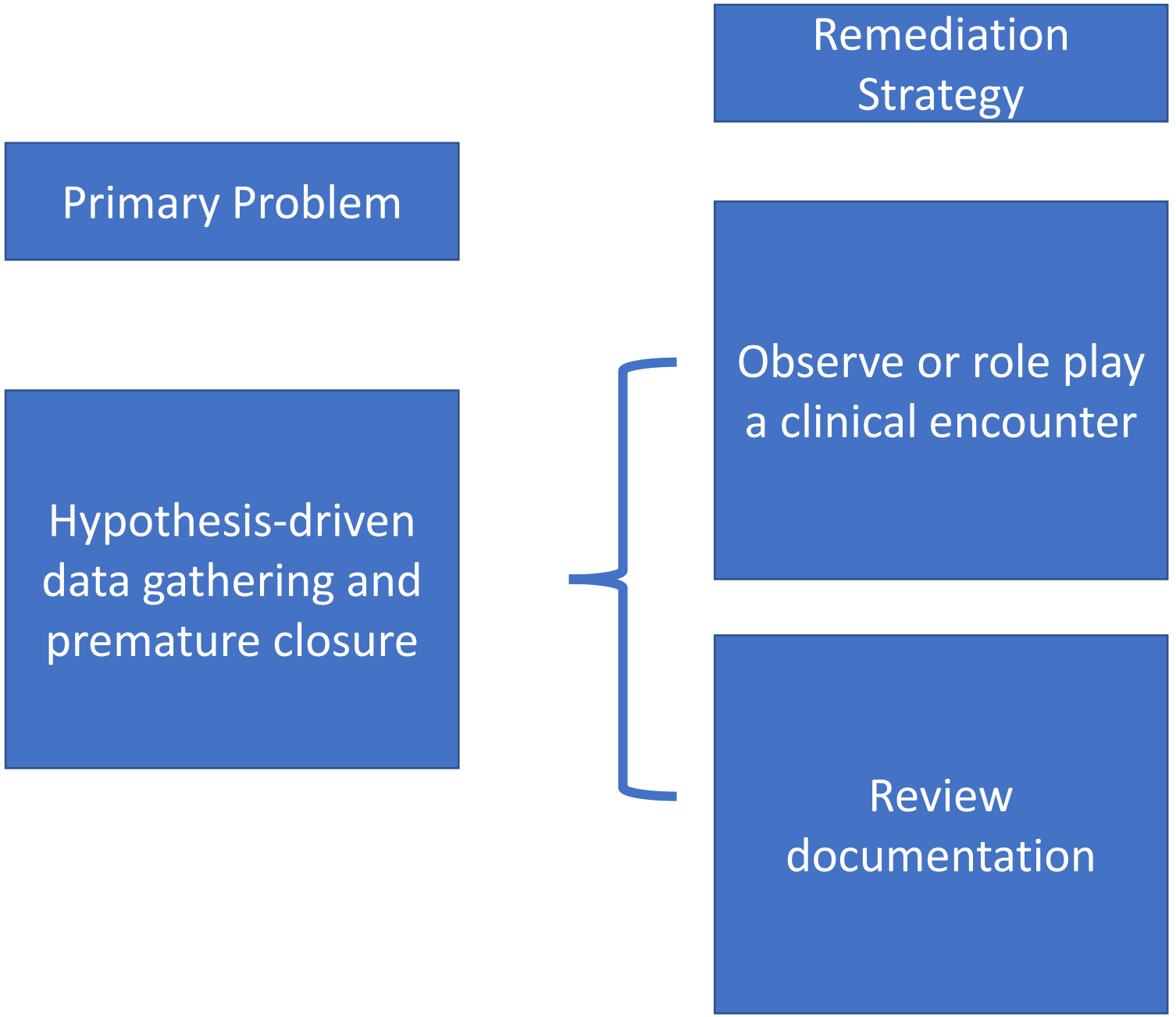
+ tobacco

https://www.pinterest.com/pin/208291551492131517/

Biases

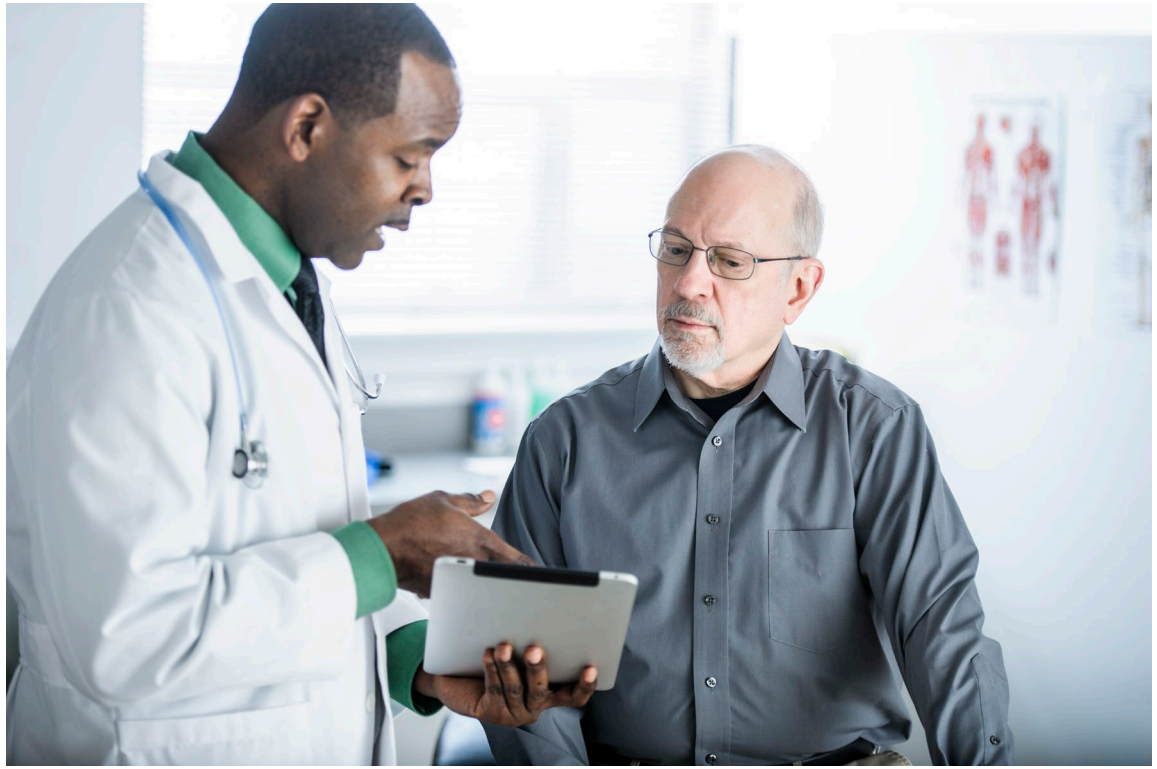


Remediation in Medical Education. 2014


Remediation Strategy
Primary Problem
Observe or role play a clinical encounter
Hypothesis-driven data gathering and premature closure
Review documentation

Essential Tasks		Assessment of Behaviors		
Learner Function	**Specified Task**	**Instructions: Circle the box corresponding to the learner's observed behavior**		
Collecting • Data gathering *– recognition of urgent or emergent clinical scenario*	• **Collect/Report** history and exam data in hypothesis-directed manner • **Recognize** patient and disease specific factors as potential etiologies of decompensation • **Recognize** severity of clinical problem and contextual signs of urgency or emergency	○ Non-focused history and exam ○ Included extraneous information ○ Missed key findings ○ Did not recognize contextual clues of urgency	○ History and exam reflect potential diagnoses ○ Limited recognition of urgent contextual clues ○ Included limited pertinent positive and negative findings	○ Logical history and exam for potential diagnoses ○ Questions assessed likelihood of specific diagnoses ○ Full recognition of urgency contextual clues ○ Prioritization on pertinent positive and negative findings

Direct Observation



Peterson et al.REACT. JGIM. 2022

Role Play

- Act out history
- Discuss physical exam features
- Prioritize a differential

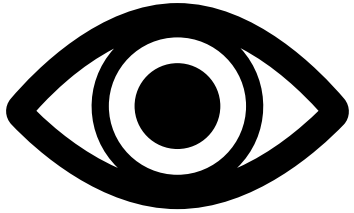
Remediation in Medical Education. 2014
Baker. Teaching & Learning in Medicine. 2015.

Documentation

Rate the quality of each section of the written note based on the extent to which defined elements are present
1 = minimal to no elements
2 = some to many elements
3= most or all elements

WRITTEN HISTORY			
Detailed history of presenting illness Defined as including a complete description of the complaint(s) such as location, quality, severity, duration, timing, radiation, factors that aggravate or alleviate symptoms	1	2	3
Descriptive history of presenting illness Defined by use of semantic and descriptive vocabulary such as acute or chronic, sharp or dull, continuous or intermittent	1	2	3
Chronologic history of presenting illness Defined as telling a clear story that flows logically	1	2	3
Contextualized history of presenting illness Defined by identification and inclusion of key findings from past, family and social history and relevant other symptoms that might otherwise belong in later portions of the comprehensive history	1	2	3
Complete comprehensive history Defined as a complete past, family, and social histories and complete review of systems	1	2	3
WRITTEN PHYSICAL EXAMINATION FINDINGS			
Complete physical examination Defined as documenting a comprehensive examination	1	2	3
Key physical examination findings Defined as including an exam that highlights the absence and presence of key exam findings, as suggested by the diagnostic possibilities	1	2	3

Remediation in Medical Education. 2014
Baker. Teaching & Learning in Medicine. 2015.



Recognize and diagnose	Coaching and practice	Application and review
Hypothesis generation Premature closure	Direct observation Role play Assign written cases	Leading and prioritized ddx Key features for comparisons Review documentation

DX: hypothesis generation and premature closure

Tx:

Meet with Dr. Vick to role play the last 2 patients seen in clinic

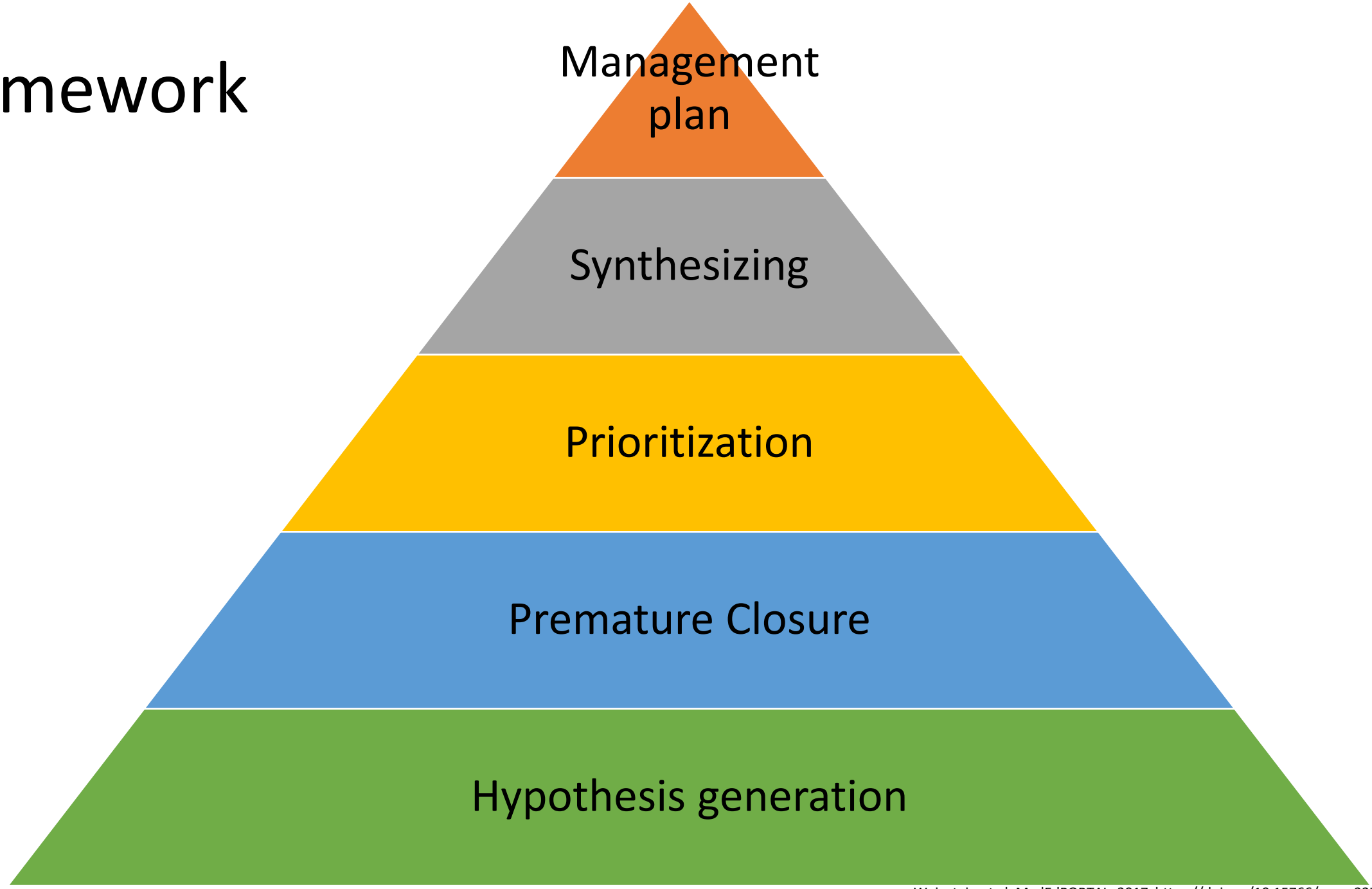
Assign 2 cases/week to foster systemic generation of ddx

Provide prompts to apply to cases and bring in 2 cases to review together

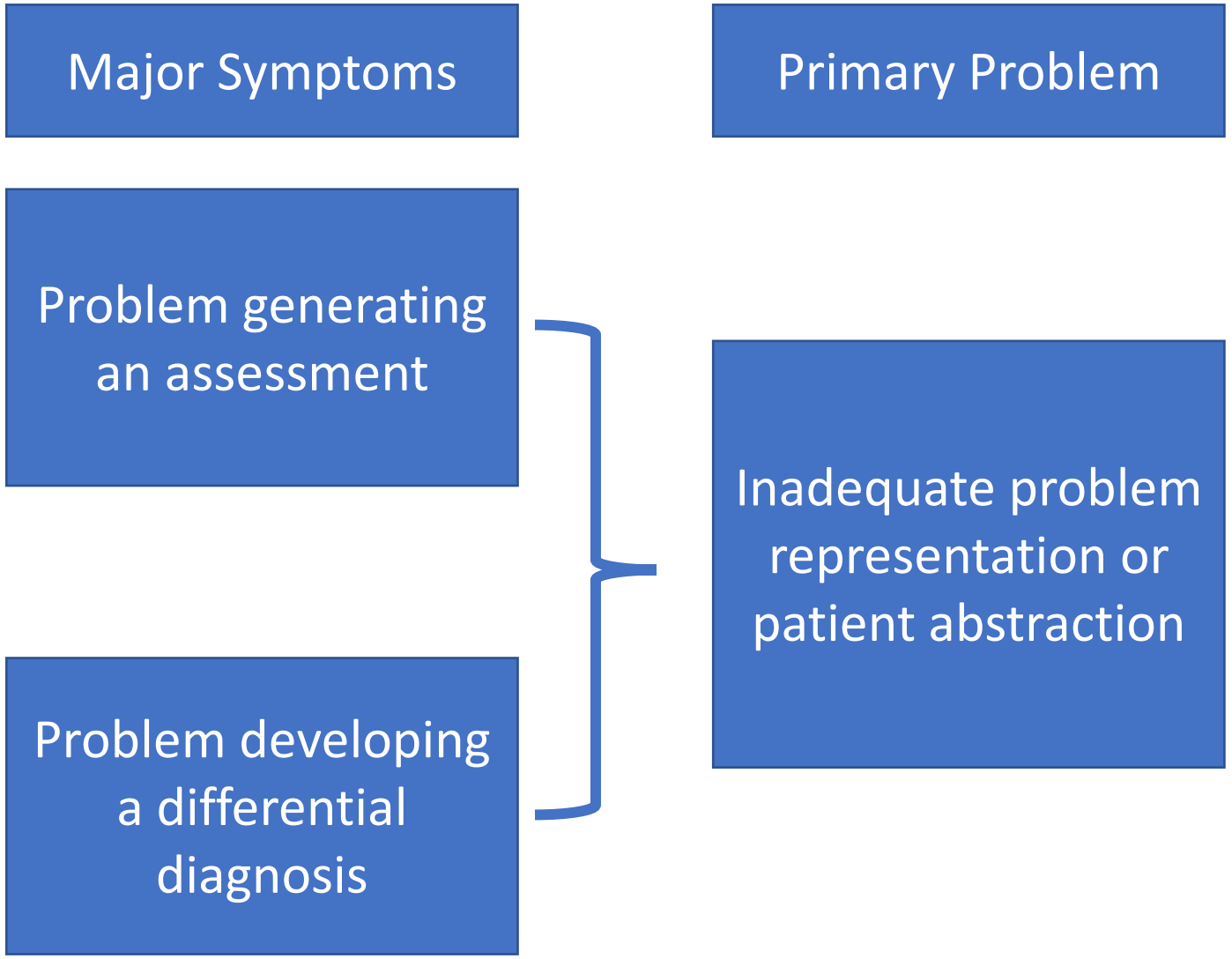
REFILL 0 1 2 4 5 PRN

Case 2

Framework



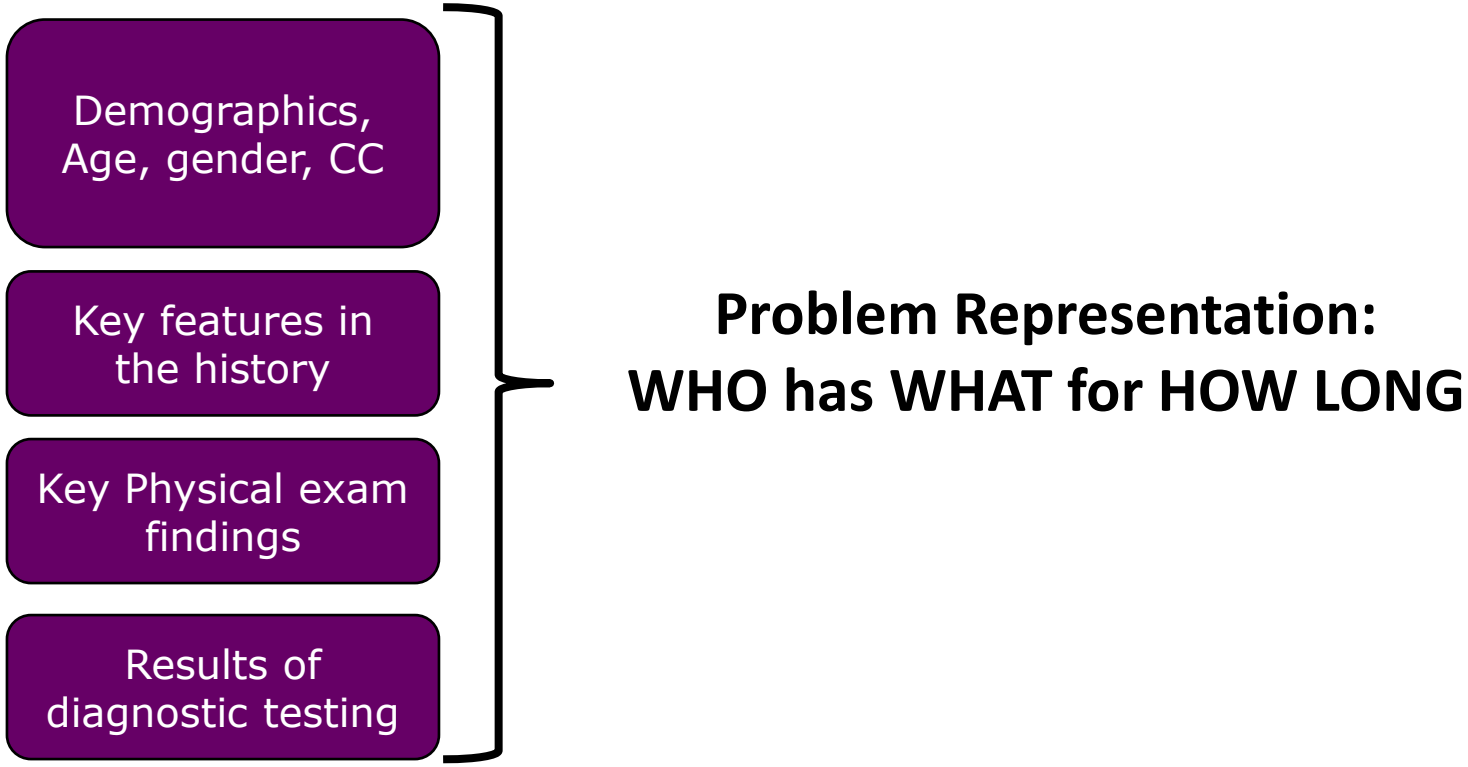
Weinstein et al. MedEdPORTAL. 2017. https://doi.org/10.15766/mep_2374-8265.10650



Remediation in Medical Education. 2014

Problem Representation

- Summary of the clinical picture
- Becomes more and more detailed as additional data is collected



Weinstein et al. MedEdPORTAL. 2017. https://doi.org/10.15766/mep_2374-8265.10650

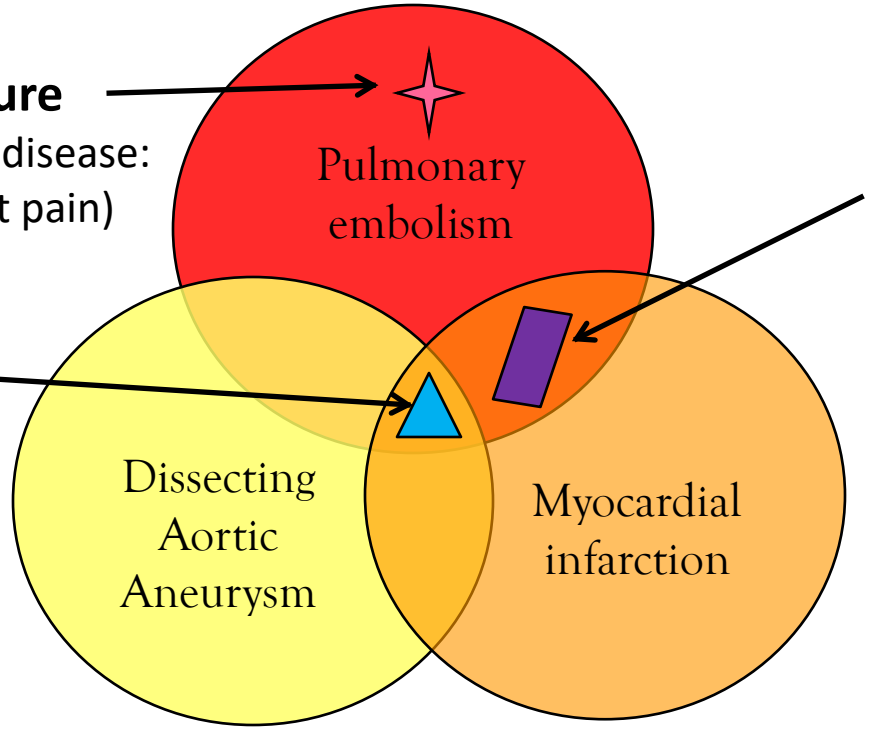
Identifying Differentiating & Key Features

Clues that can help generate a differential diagnosis and distinguish between diseases with shared characteristics

Key Feature
(unique to that disease: pleuritic chest pain)

Differentiating Feature
(unique to a subset of diseases: Shortness of breath)

Syndrome
(constellation of signs and symptoms that are common to several diseases: chest pain)



Bowen, 2006
Organizing Knowledge and Information, Dr. Catherine Lucey

Semantic Qualifiers

Paired

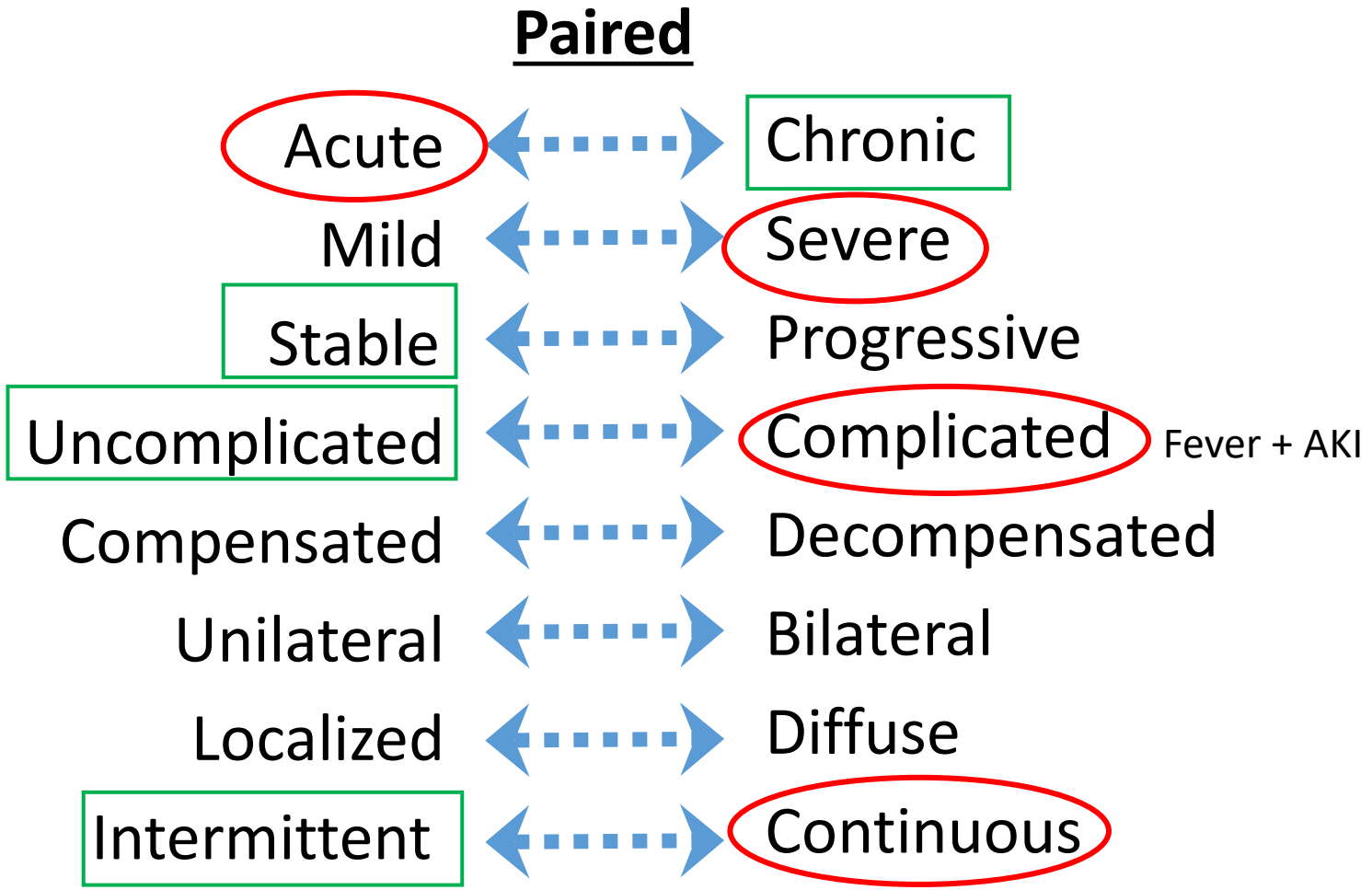
Acute	Chronic
Mild	Severe
Stable	Progressive
Uncomplicated	Complicated
Compensated	Decompensated
Unilateral	Bilateral
Localized	Diffuse
Intermittent	Continuous

Unpaired

- Location
- Pattern
- Association

Weinstein et al. MedEdPORTAL. 2017. https://doi.org/10.15766/mep_2374-8265.10650

Semantic Qualifiers: Diarrhea



Unpaired

- Location
- Pattern
- Association

DX: prioritization of key features (problem representation)

Tx: _____

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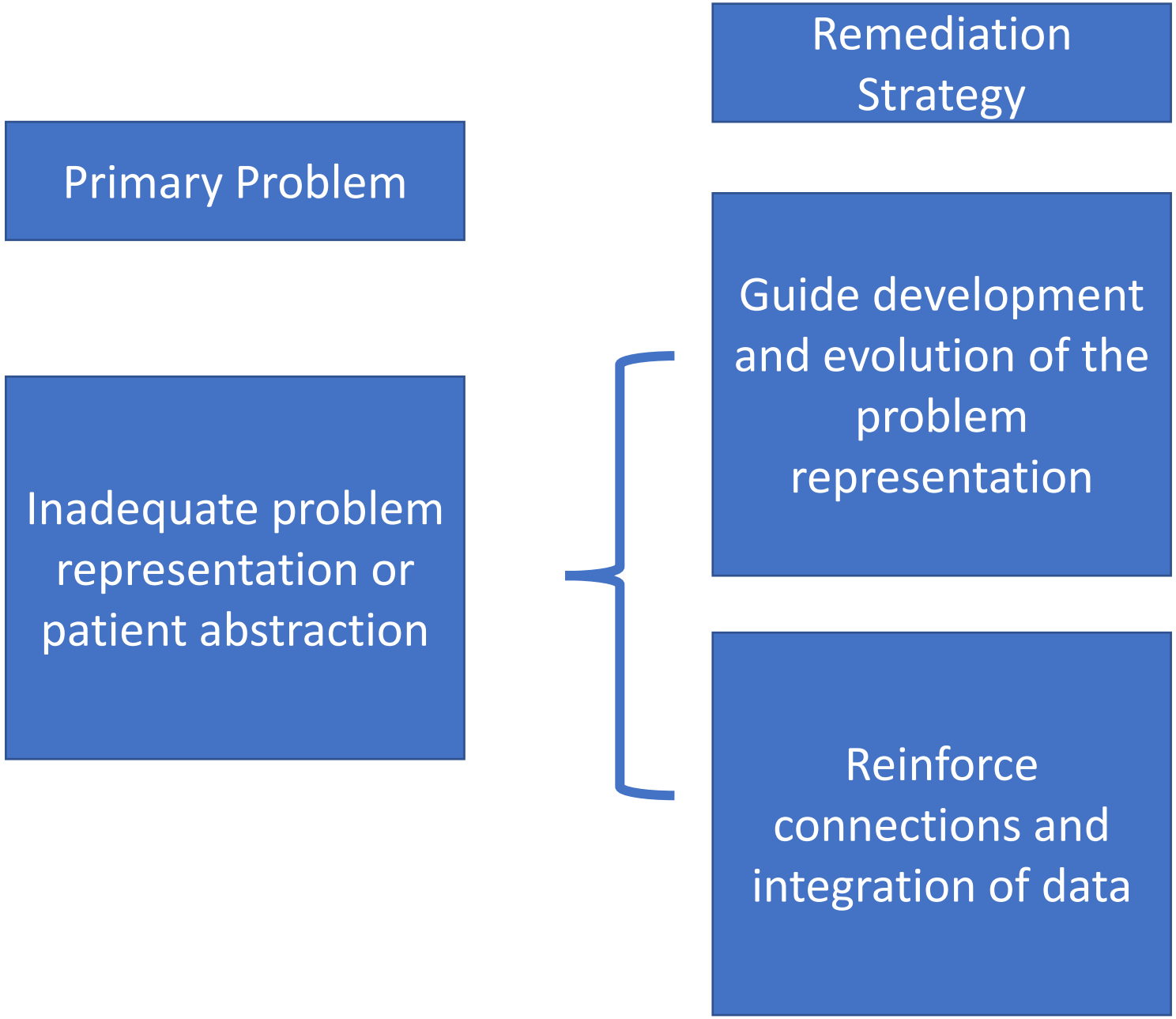
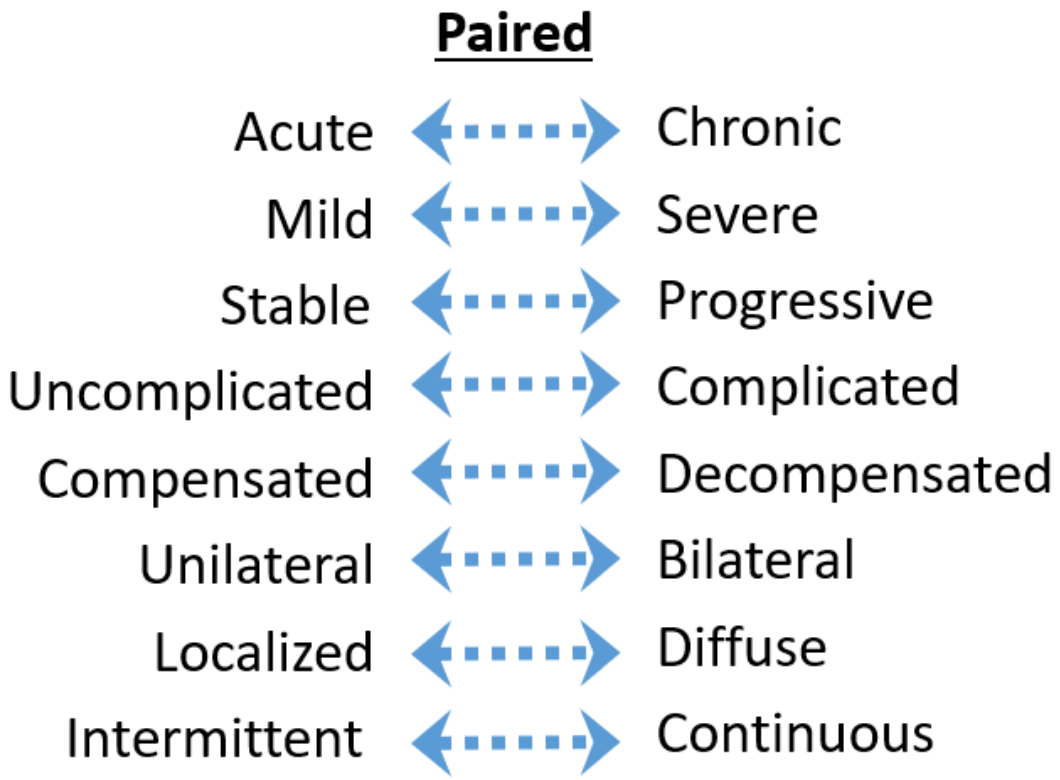


Remediation in Medical Education. 2014

Development and evolution of the problem representation

- Buy a qualifier
  - Buy 2 semantic features
  - Discriminating factors

- Reverse presentations (ASOAP)
  - Assessment first
  - Presentation justifies assessment

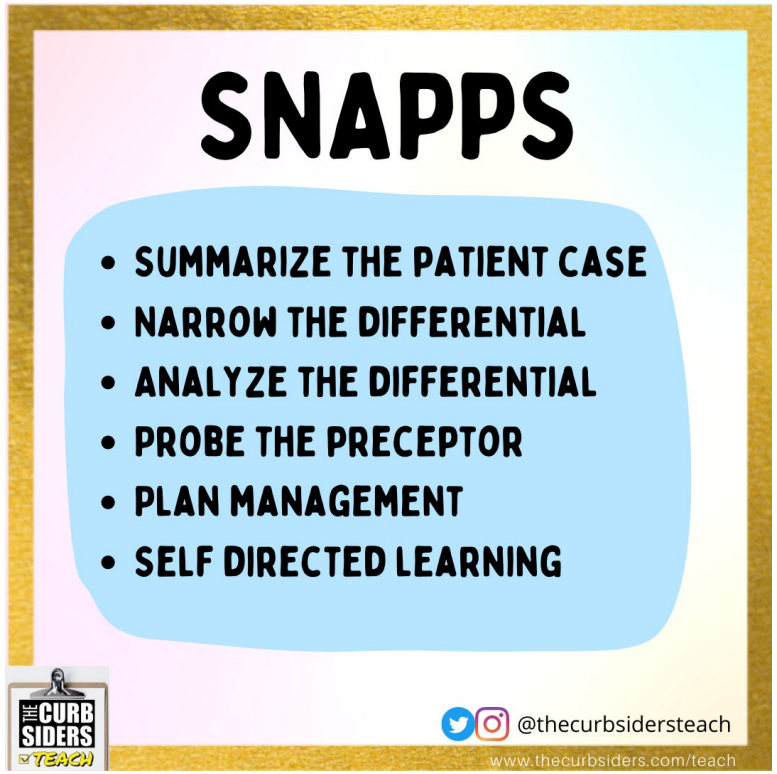


Reinforce connections and integration of data

- One Minute Preceptor
- SNAPPS
- IDEA (notes)
- Scaffolding
- Contrasting cases
- Asking “why”

One Minute Preceptor Model

1. Ask questions to get a commitment
2. Ask questions to get justification
3. Provide a brief teaching point
4. Provide reinforcing feedback
5. Provide constructive feedback



Reinforce connections and integration of data

- One Minute Preceptor
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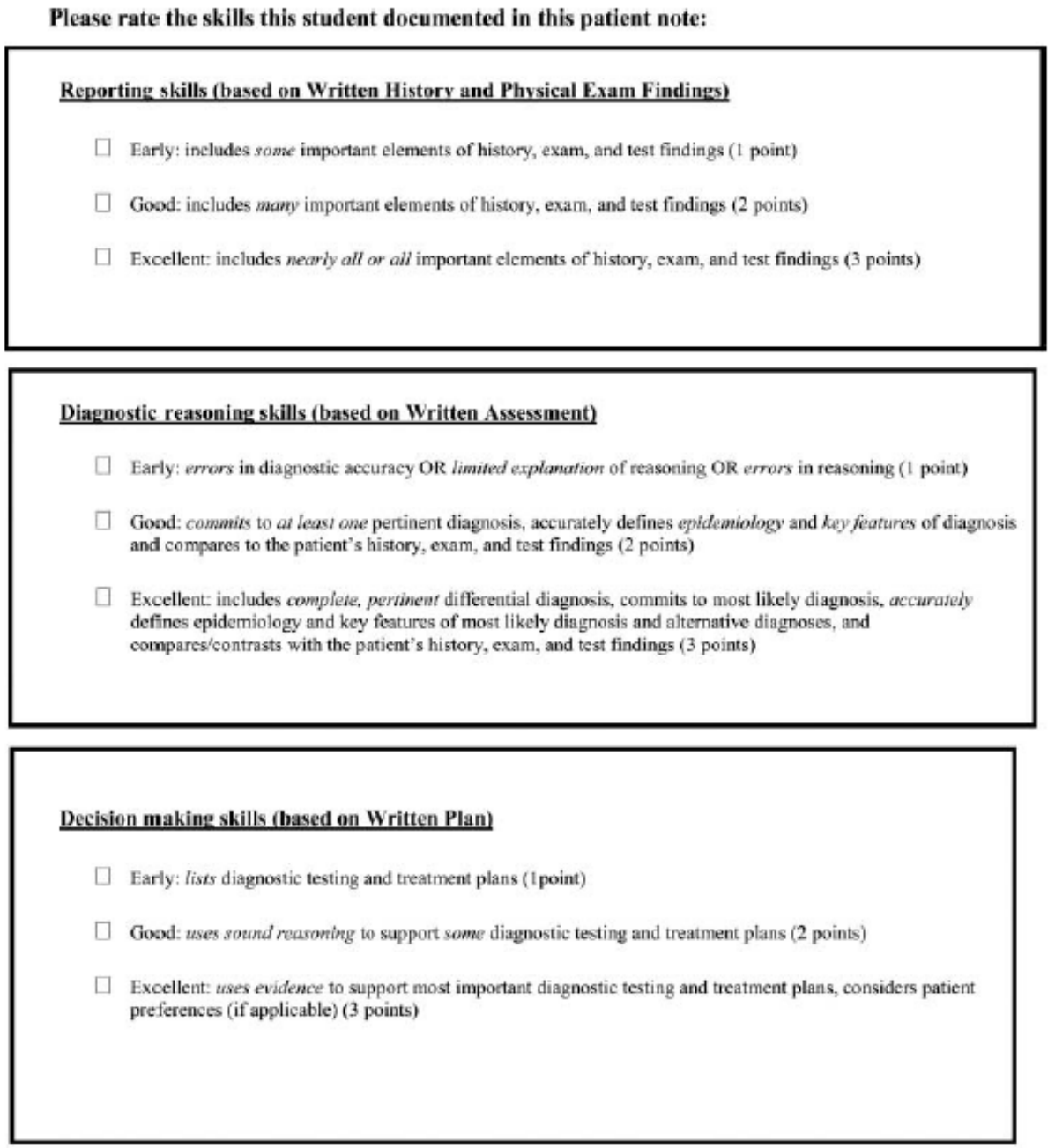


Please rate the skills this student documented in this patient note:

Reporting skills (based on Written History and Physical Exam Findings)

- ☐ Early: includes *some* important elements of history, exam, and test findings (1 point)
- ☐ Good: includes *many* important elements of history, exam, and test findings (2 points)
- ☐ Excellent: includes *nearly all or all* important elements of history, exam, and test findings (3 points)

Diagnostic reasoning skills (based on Written Assessment)

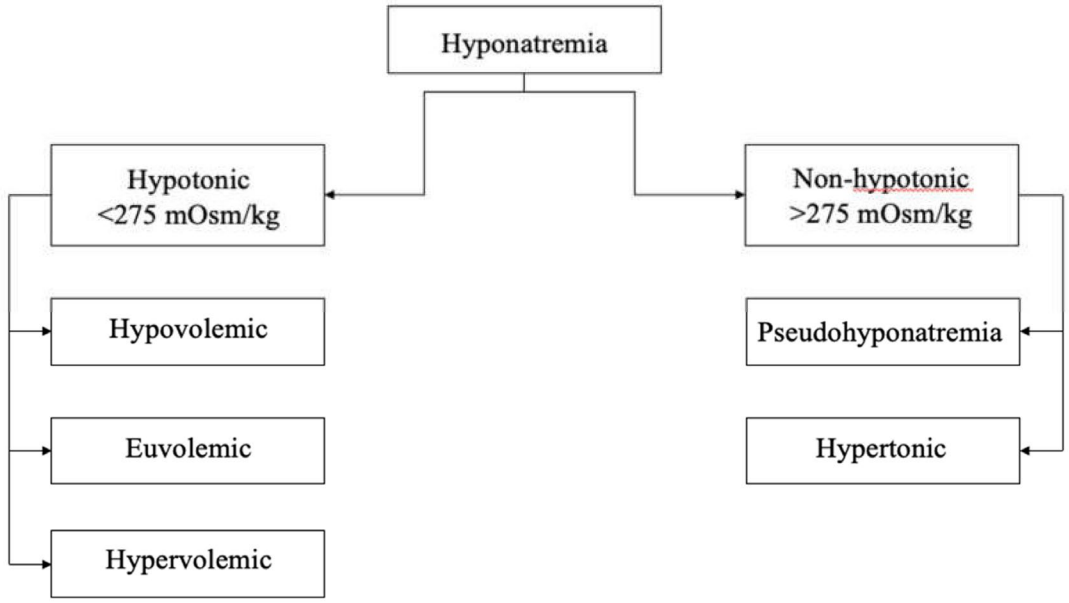
- ☐ Early: *errors* in diagnostic accuracy OR *limited explanation* of reasoning OR *errors* in reasoning (1 point)
- ☐ Good: *commits* to *at least one* pertinent diagnosis, accurately defines *epidemiology* and *key features* of diagnosis and compares to the patient's history, exam, and test findings (2 points)
- ☐ Excellent: includes *complete, pertinent* differential diagnosis, commits to most likely diagnosis, *accurately* defines epidemiology and key features of most likely diagnosis and alternative diagnoses, and compares/contrasts with the patient's history, exam, and test findings (3 points)

Decision making skills (based on Written Plan)

- ☐ Early: *lists* diagnostic testing and treatment plans (1point)
- ☐ Good: *uses sound reasoning* to support *some* diagnostic testing and treatment plans (2 points)
- ☐ Excellent: *uses evidence* to support most important diagnostic testing and treatment plans, considers patient preferences (if applicable) (3 points)

Reinforce connections and integration of data

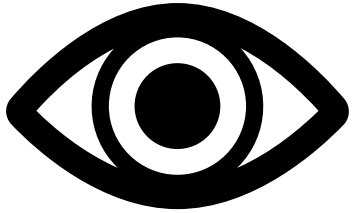
- One Minute Preceptor
- SNAPPS
- IDEA (notes)
- Scaffolding
- Contrasting cases
- Asking “why”



Key features	Crohn’s disease	Ulcerative colitis
Location		
Upper parts of GIT	Rarely	Never
Distal Ileum	Very common	Never
Colon	Common	Always
Rectum	Rarely	Never
Signs and symptoms	Pain in the lower right abdomen, swelling, thickening of the bowel wall	Pain in the lower left abdomen, diarrhea, weight loss, rectal bleeding

Abbreviation: GIT, gastrointestinal tract.

https://www.researchgate.net/figure/Comparison-of-key-features-in-Crohns-disease-and-ulcerative-colitis_tbl1_264433805



Recognize and diagnose	Coaching and practice	Application and review
Prioritization of key features Develop and refine a problem representation	Case summaries with semantic qualifiers Utilize cases to develop a problem representation, provide new data and refine	Commit to leading dx Reverse presentations OMP or SNAAPS Review documentation

DX: prioritization of key features (problem representation)

Tx:

Meet with Dr. Wolak to review this weeks H&Ps; review PR's and refine them

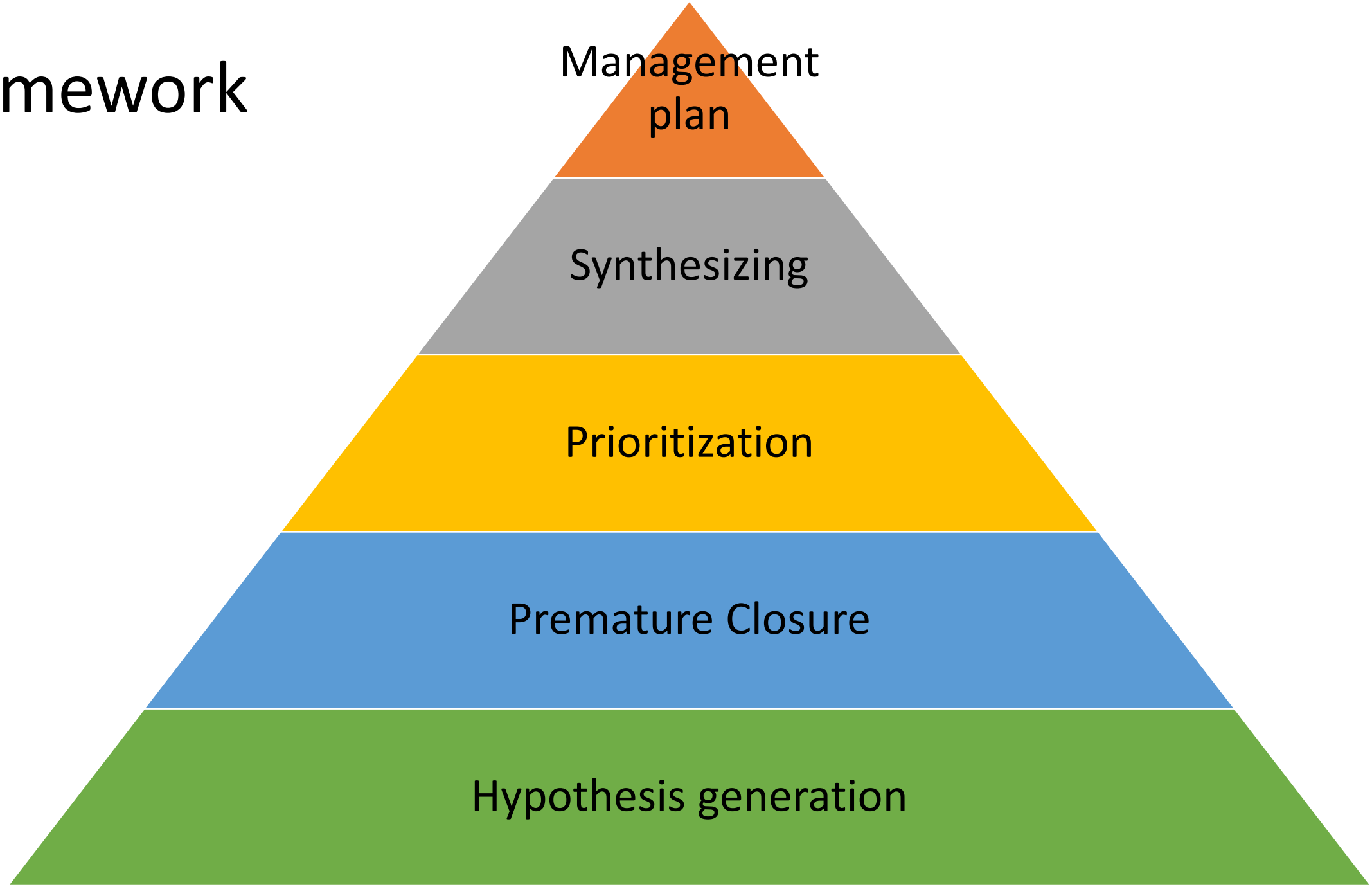
Assign cases from Frameworks of Internal Medicine to develop PR's

Utilize ASOAP on rounds

REFILL 0 1 2 4 5 PRN

Case 3

Framework



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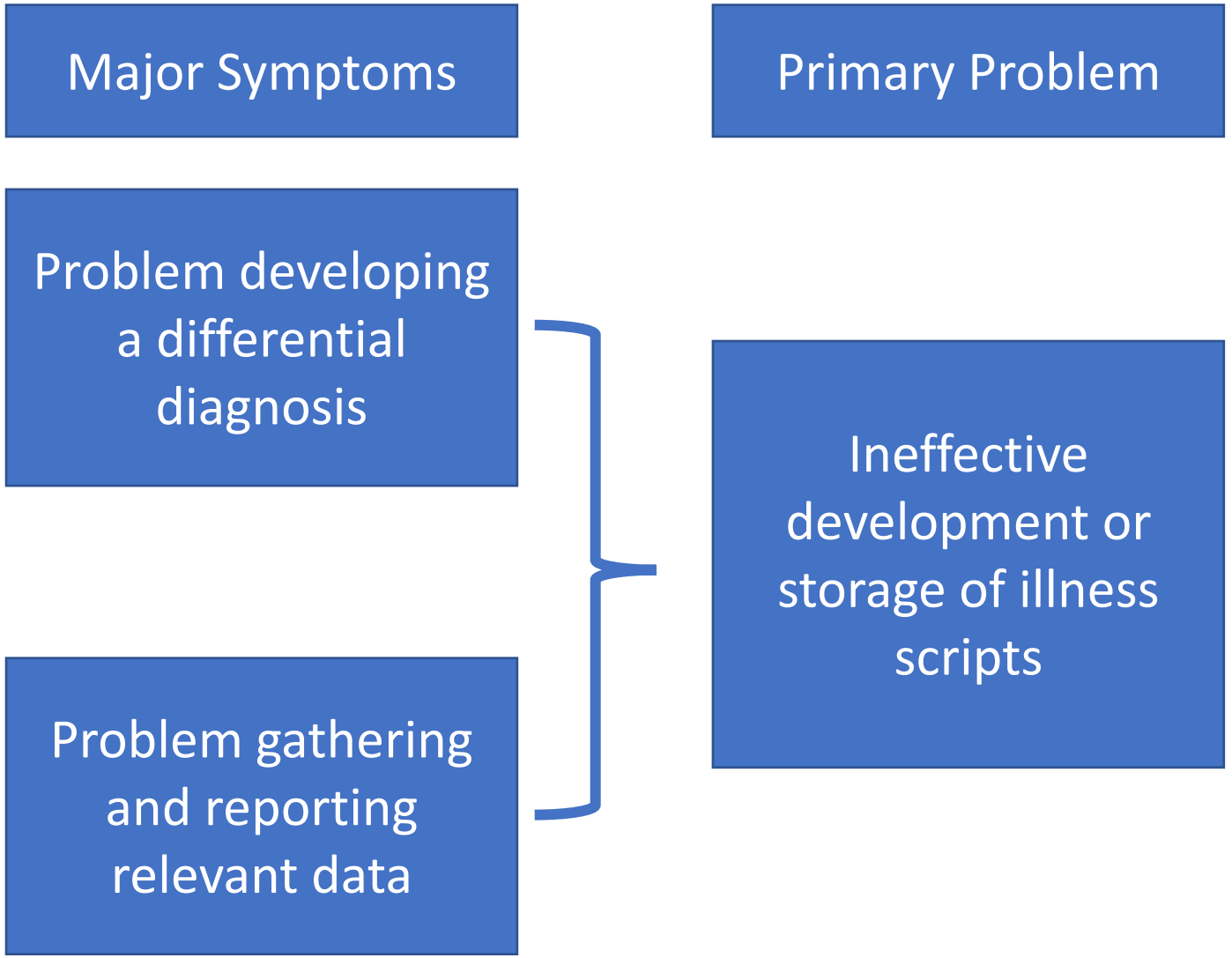


Remediation in Medical Education. 2014

Organizing Knowledge

*What are the **key features** from the history and PE?*

- Tempo/course of the CC/HPI
- Age, exposures, other risk factors
- Key findings

Recognize pertinent positive AND negative findings

Can the patient's illness be characterized as a particular 'syndrome'?

Weinstein et al. MedEdPORTAL. 2017. https://doi.org/10.15766/mep_2374-8265.10650

Lump or Split

How will we discern that THIS is the problem?

Lump or Split

<u>Symptoms and Signs</u>

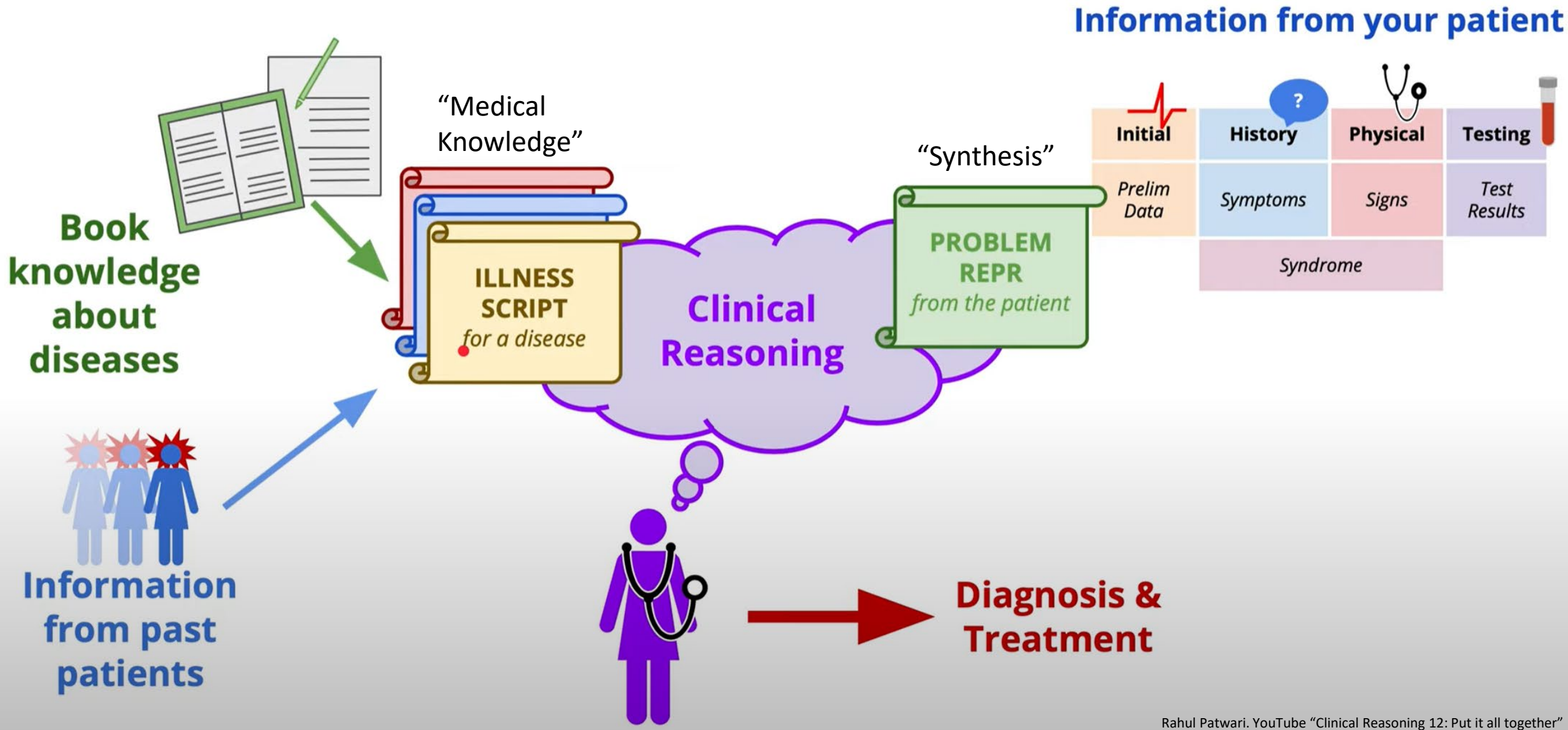
1. Fever
   - Differential…
2. RUQ pain
   - Differential…
3. Jaundice
   - Differential…

VS

<u>Symptoms and Signs</u>

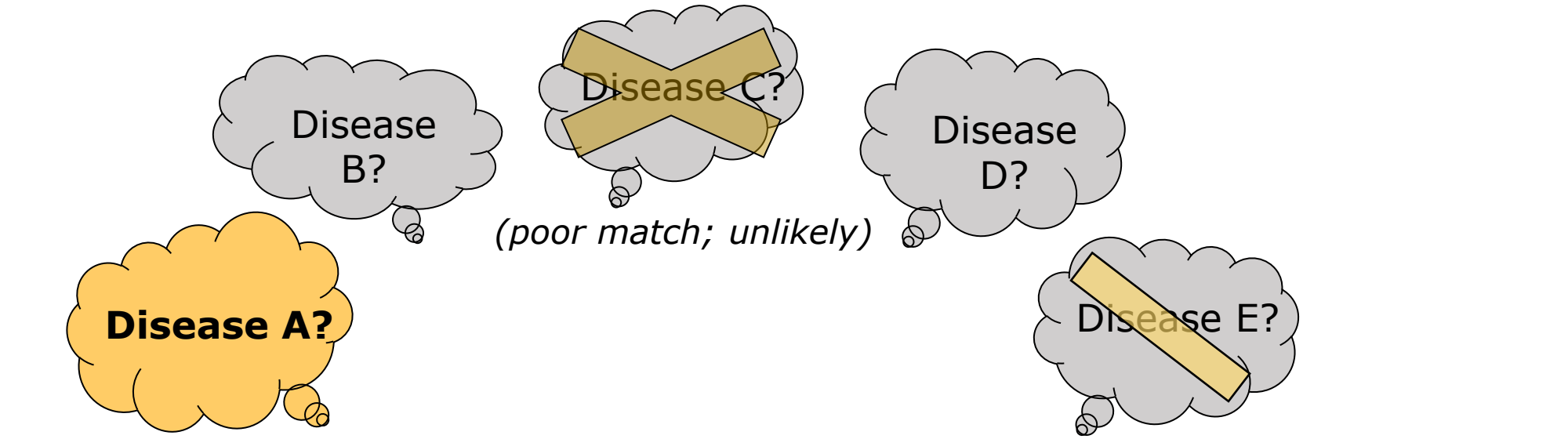
1. Fever + RUQ pain + jaundice
   - Differential…

Illness script scanning



Rahul Patwari. YouTube "Clinical Reasoning 12: Put it all together"

Prioritizing the Differential Diagnosis

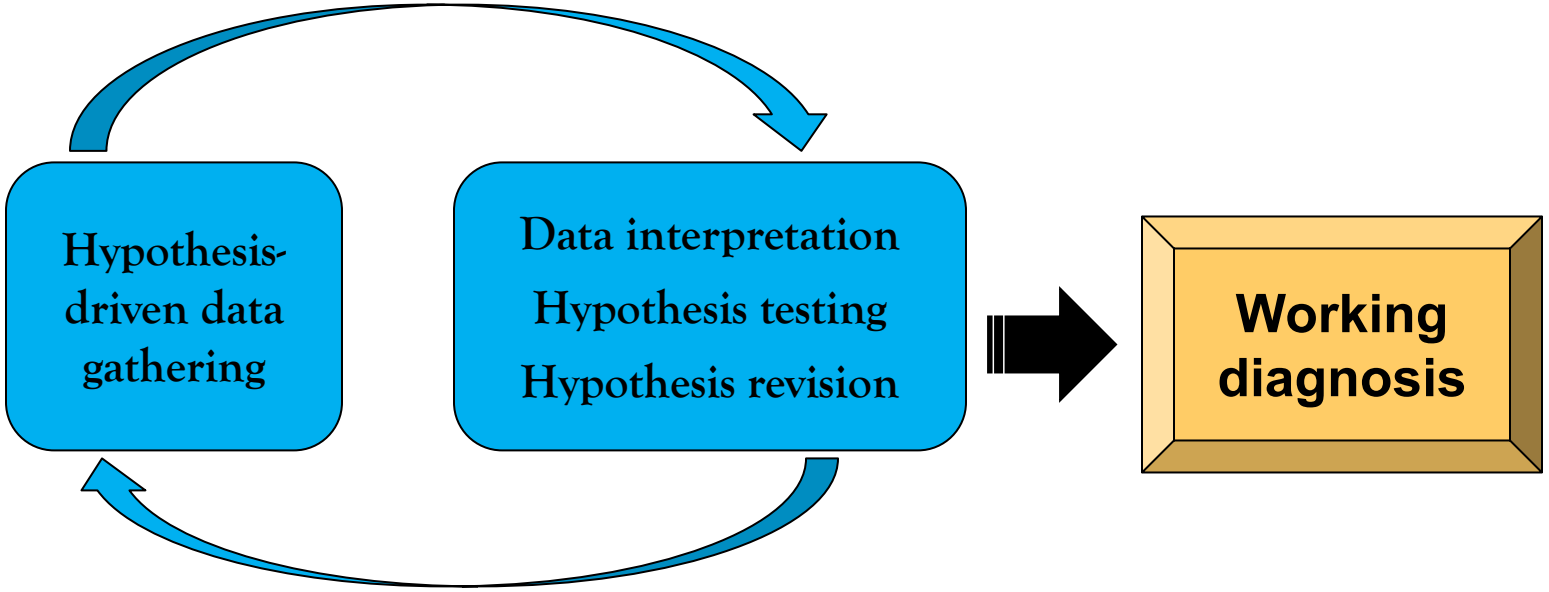


How will we discern that THIS is the problem?

Weinstein et al. MedEdPORTAL. 2017. https://doi.org/10.15766/mep_2374-8265.10650

The Working Diagnosis

The one ***most likely*** at a given point in the data gathering process.

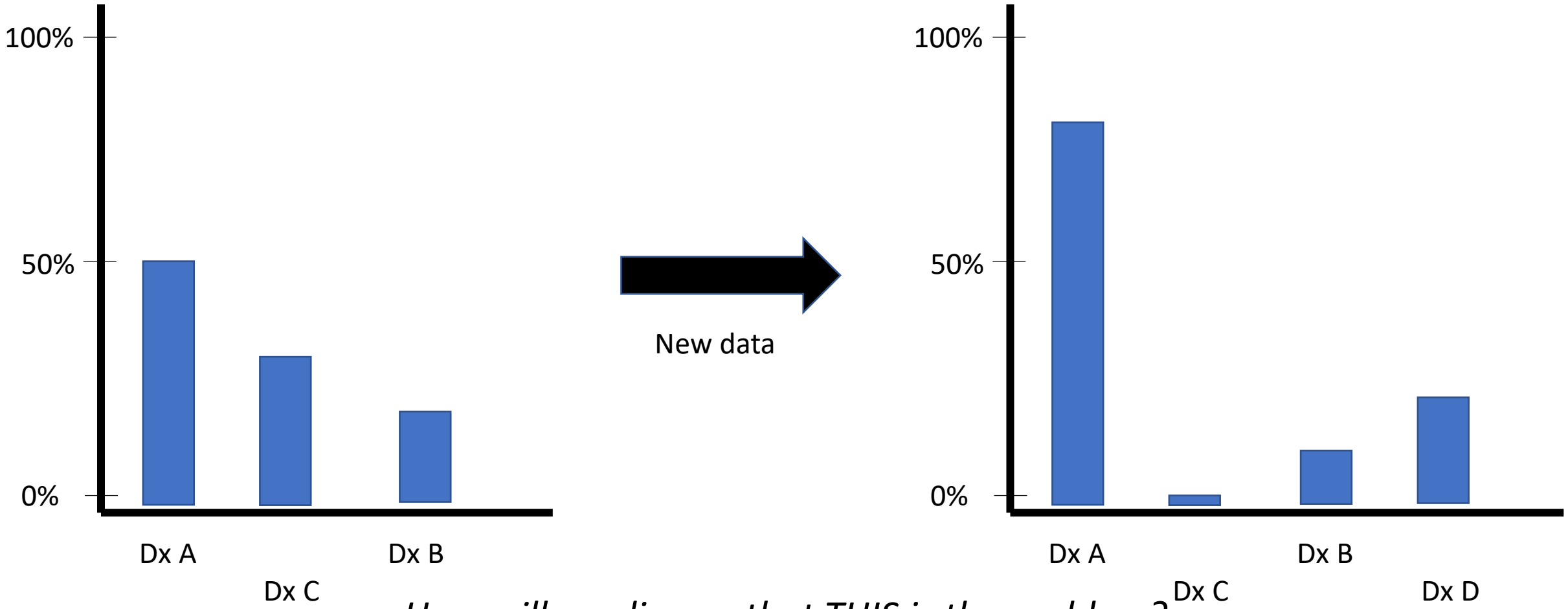


*Is the learner **changing the working dx** as new information is obtained?*

(new symptoms, exam findings, or study results inconsistent with previous working dx)

Weinstein et al. MedEdPORTAL. 2017. https://doi.org/10.15766/mep_2374-8265.10650

Adjusting the Working Diagnosis



How will we discern that THIS is the problem?

DX: synthesis of data and seeing the “big picture”

Tx: _____

REFILL 0 1 2 4 5 PRN

Essential Tasks		Assessment of Behaviors		
Learner Function	**Specified Task**	**Instructions: Circle the box corresponding to the learner's observed behavior**		
Interpreting • Diagnostic reasoning – *differential diagnosis*	• **Generate** prioritized differential diagnosis of most likely, less likely, unlikely in urgent clinical situations	○ Differential diagnosis missing likely or "can't miss" diagnoses in urgent situations ○ Includes inappropriate diagnoses	○ Differential diagnosis included likely and "can't miss" diagnoses in urgent situations but missed key diagnoses ○ Inappropriate rank-order of diagnoses	○ Accurately ranked differential diagnosis including key, likely, and "can't miss" diagnoses in urgent situations ○ Prioritized urgent diagnoses appropriately

Direct Observation

Peterson et al.REACT. JGIM. 2022

Development and evolution of the illness script

- Highlighting exercise
  - Discriminating factors

- Persuade MD
  - 30 seconds to convince MD of diagnosis

A 34-year-old woman with a history of hyperthyroidism, untreated for the past 5 years, presented to the Emergency Department via EMS with the chief complaint of dyspnea with palpitations. On review of systems, she did endorse loose stools. She denied taking daily medications.

Physical examination revealed: BP 150/78 mmHg; HR 130-170 beats/min; Temperature 36.7 C; respiratory rate 24 breaths/min; and SpO2 100% on room air. The patient was alert and oriented, but hyperactive and with an anxious affect. She repeatedly requested to leave her stretcher and was found pacing back and forth to the bathroom. She was tremulous, with no focal neurologic deficits. With the exception of tachycardia, the cardiovascular exam was within normal limits. Lungs were clear to auscultation. The skin was of normal color. Bowel sounds were hyperactive, but the abdomen was non-tender to palpation.

Her initial EKG revealed sinus tachycardia at 170 beats/min that improved to 140 beats/min following lorazepam 1 mg IV for anxiety.

Development and evolution of the illness script

- Illness script exercises

Diagnosis:					
Epi/ Risk Factors:					
HPI:					
Exam:					
Testing:					

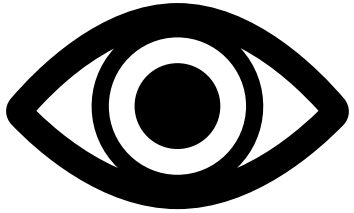
	Abrupt onset	Prior URI	Severe pain	Normal CBC	Total
Transient hip synovitis	0	+	-	++	++
Septic arthritis	++	0	++	-	+++
Reactive arthritis	0	0	+	0	+
Leukemia	--	-	+	--	----

Development and evolution of the illness script

Chart Stimulate Recall

- Uncertainty due to incomplete/conflicting information
  - History – unclear or discordant
  - Another physician/consultant
  - Labs/imaging
- Diagnostic reasoning uncertainty
  - Lump or split?
  - Severe or “can’t miss” diagnoses
  - Complex case
  - No clear illness script

Mutter et al. JGIM. 2022
Philibert. JGME. 2018
Schipper. Canadian FM. 2010
ACGME CSR Documents



Recognize and diagnose	Coaching and practice	Application and review
Synthesis of data Inability to make connections to see the “big picture”	Highlighting exercises Chart stimulated recall Utilize cases to develop and refine illness scripts	Framework for uncertainty/conflicting information Documentation review

DX: synthesis of data and seeing the “big picture”

Tx:

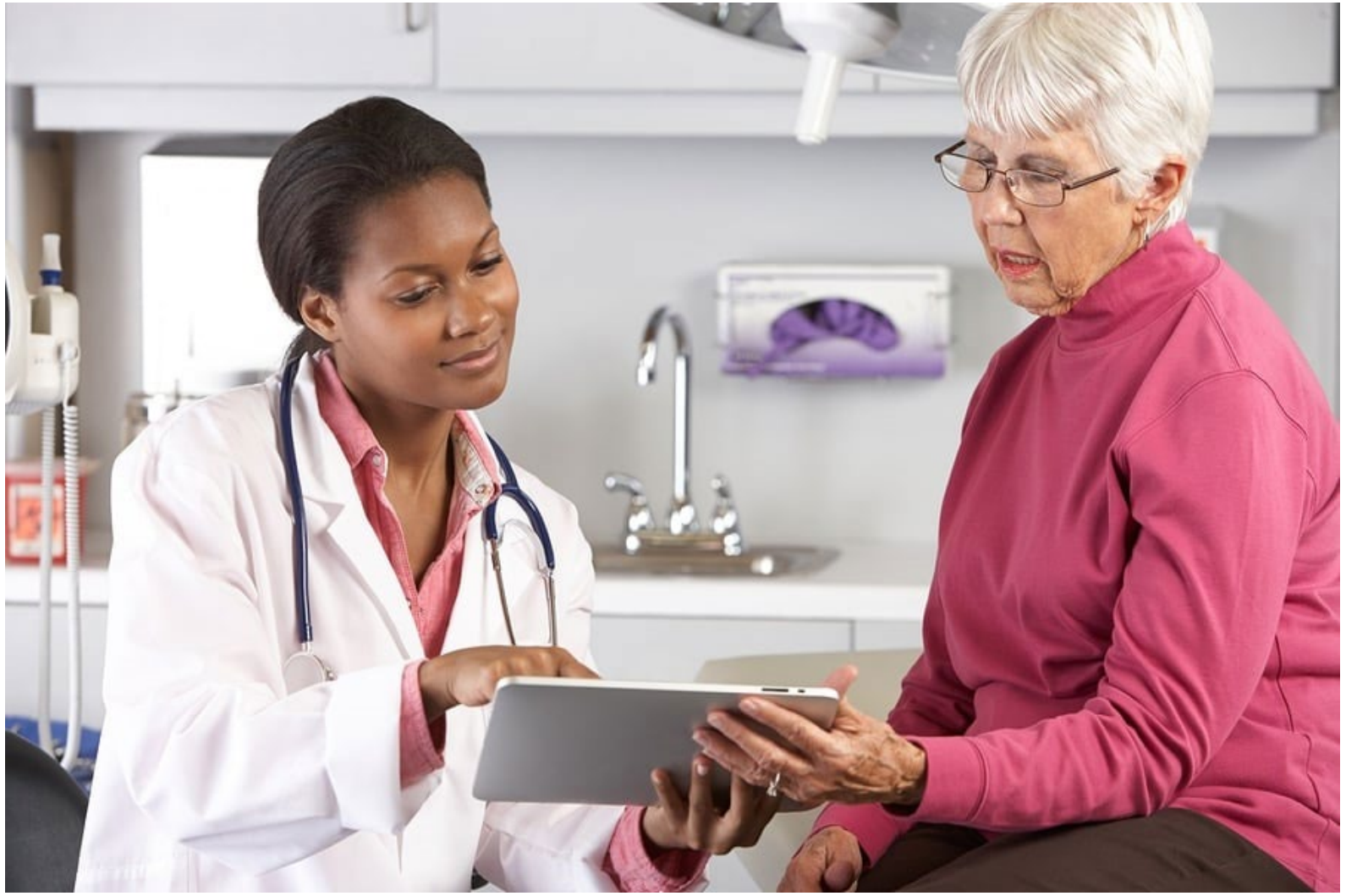
Meet with Dr. Vick to elaborate illness scripts and play persuade MD

Assign 2 cases per week with key features highlighted and be prepared to discuss reasoning

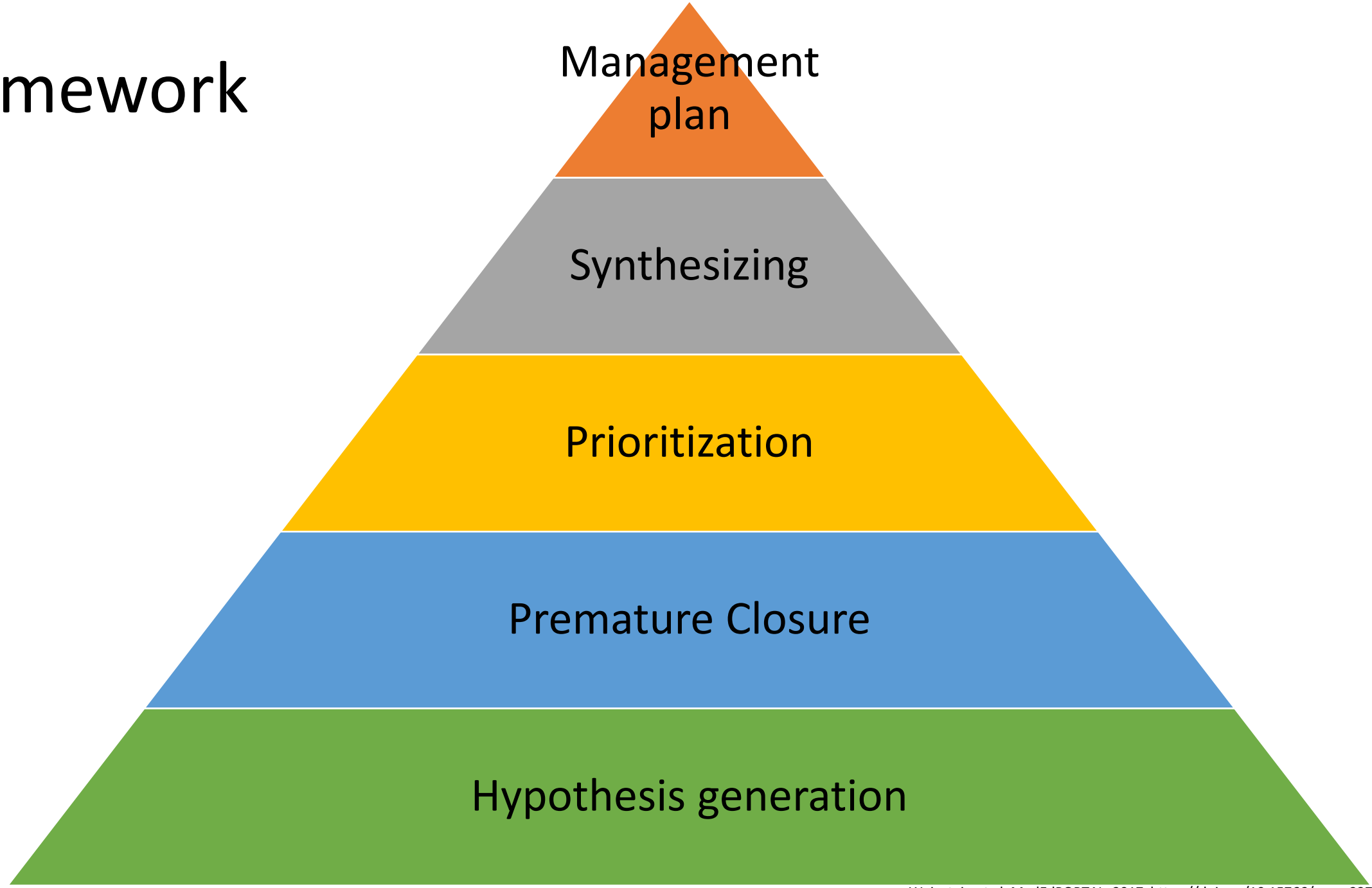
Provide and bring in 2 recent admissions H&P notes for chart stimulated recall

REFILL 0 1 2 4 5 PRN

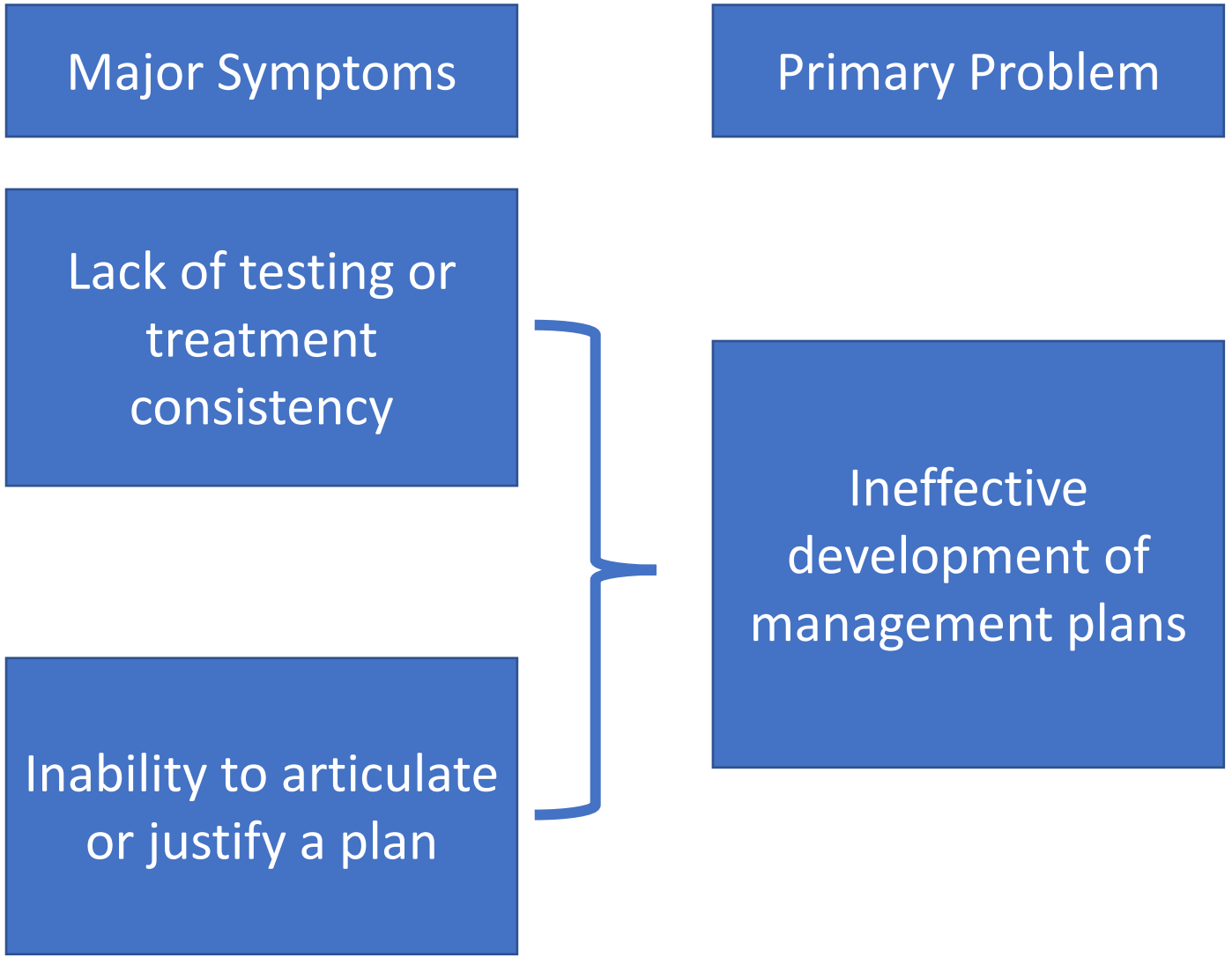
Case 4



Framework

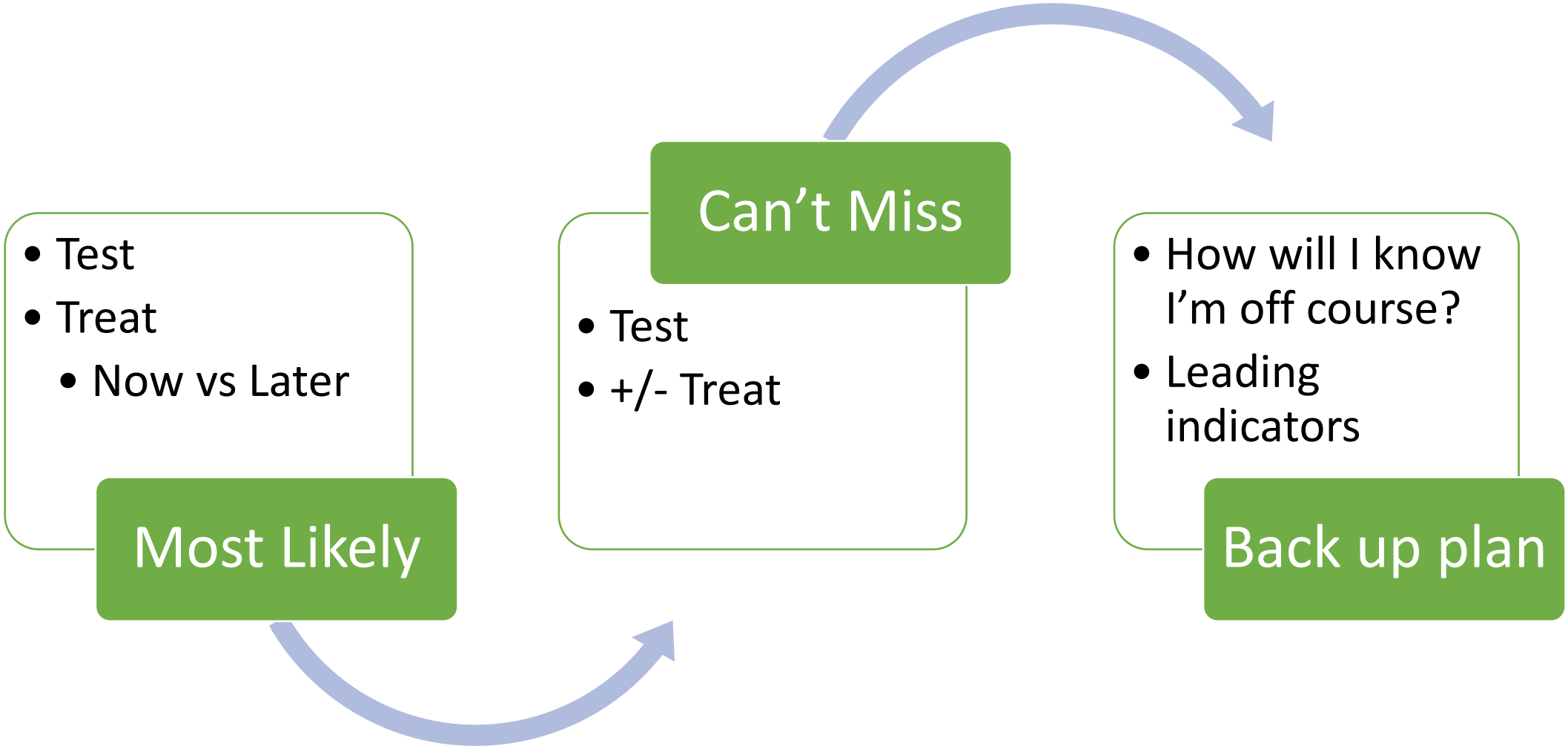


Weinstein et al. MedEdPORTAL. 2017. https://doi.org/10.15766/mep_2374-8265.10650



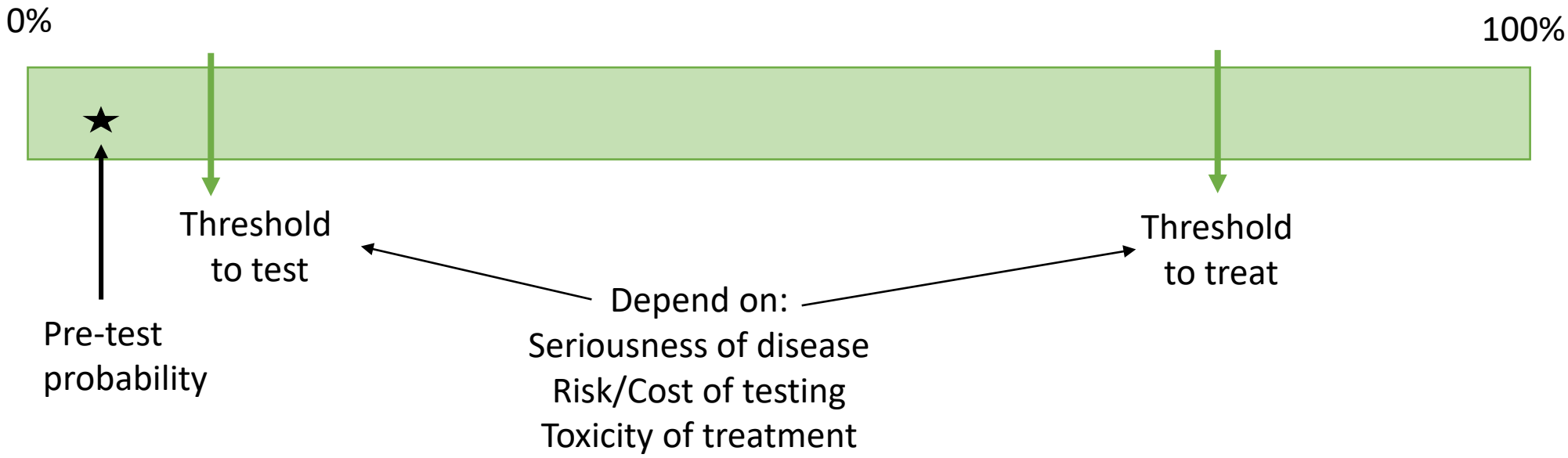
Remediation in Medical Education. 2014

Internal Consistency



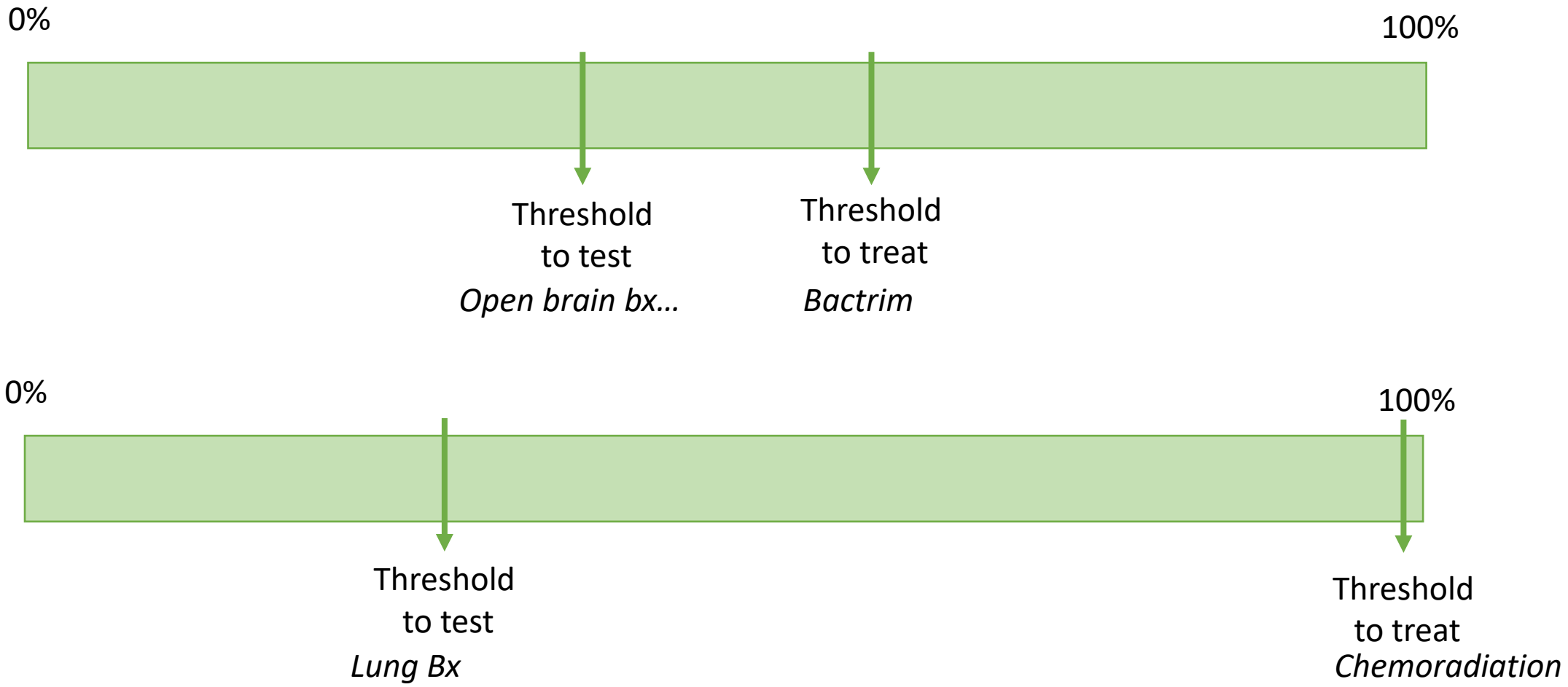
How will we discern that THIS is the problem?

Threshold to Test & Threshold to Treat



Symptom to Diagnosis: An Evidence-Based Guide. Diane Altkorn

Threshold to Test & Threshold to Treat



DX: elaborating a management plan

Tx: _____

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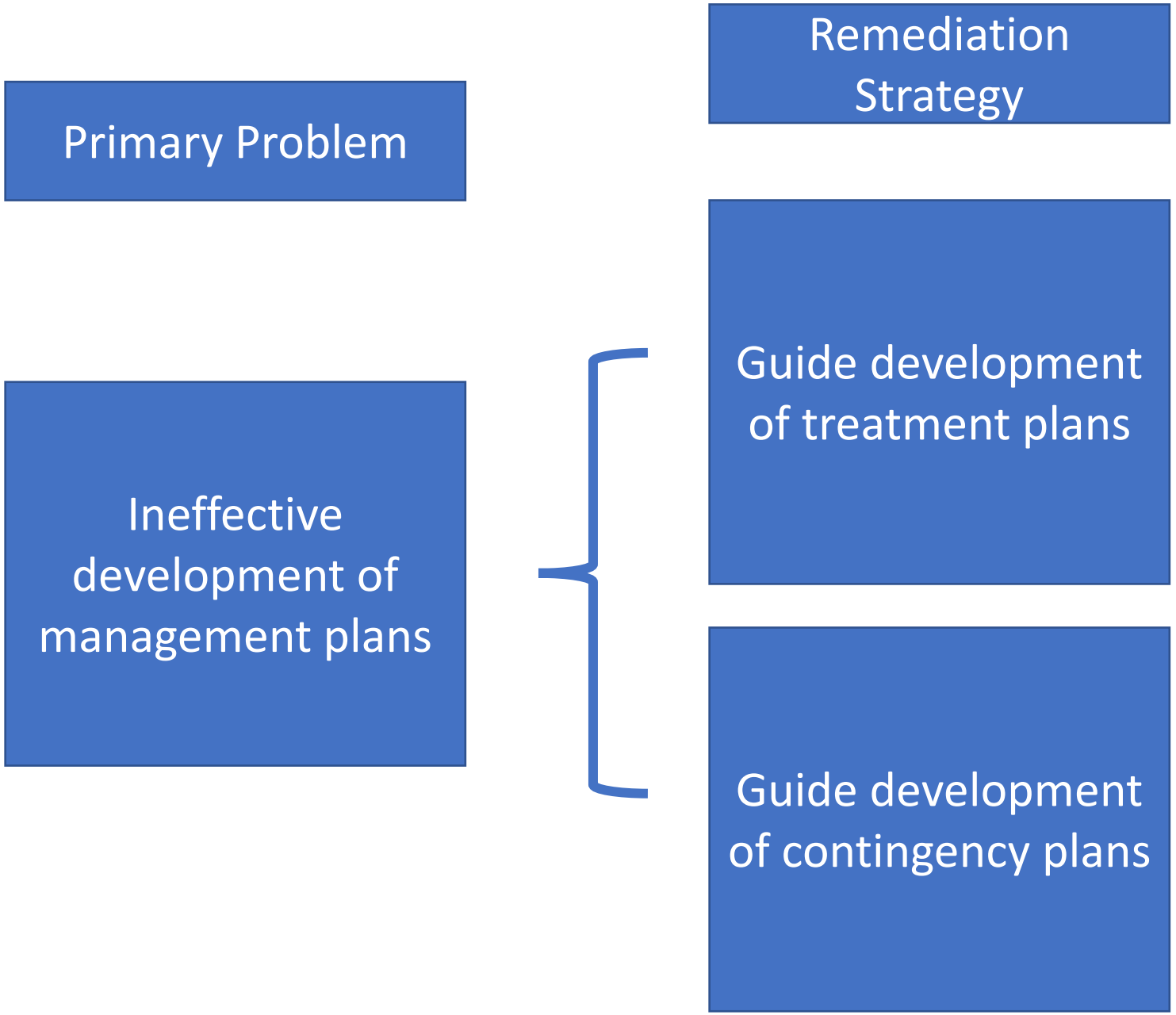
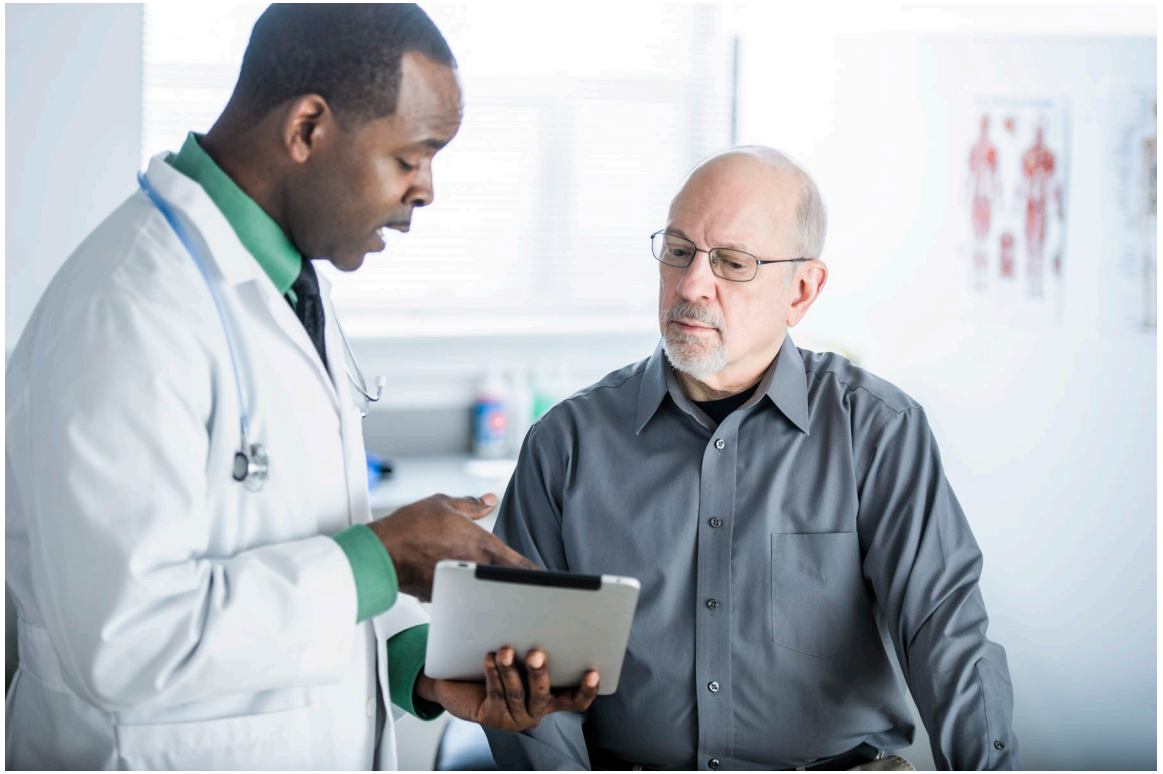

Primary Problem
Remediation Strategy
Ineffective development of management plans
Guide development of treatment plans
Guide development of contingency plans

Essential Tasks		Assessment of Behaviors		
Learner Function	**Specified Task**	**Instructions: Circle the box corresponding to the learner's observed behavior**		
Managing • Management reasoning *- initial management option selection* *- response to dynamic information*	• **Direct** evaluation and treatment towards high priority diagnoses • **Initiate** management in patient with urgent decompensation • **Recognize** need to escalate patient care	○ Directed evaluation and treatment toward unlikely/unimportant diagnoses ○ Did not evaluate or treat most likely urgent diagnoses ○ Did not evaluate for response to initial management plan	○ Major focus of evaluation and treatment on likely and urgent diagnoses ○ Included non-essential testing ○ Evaluated for response to initial management plan	○ Efficiently directed management towards most likely and urgent diagnoses ○ Deferred tests directed towards less likely or less important diagnoses ○ Evaluated for response to initial interventions

Direct Observation



Peterson et al.REACT. JGIM. 2022

Development of plans (and contingency plans)

Chart Stimulate Recall

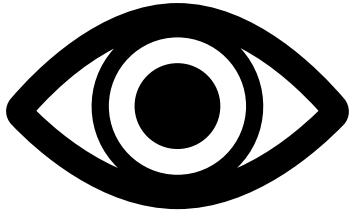
- Uncertainty due to incomplete/conflicting information
  - History – unclear or discordant
  - Another physician/consultant
  - Labs/imaging
- Diagnostic reasoning uncertainty
  - Lump or split?
  - Severe or “can’t miss” diagnoses
  - Complex case
  - No clear illness script

- Management Uncertainty
  - Diagnostic uncertainty → Treat or not?
  - Risk/benefit of management decisions
  - Adverse outcome reviews

Mutter et al. JGIM. 2022
Philibert. JGME. 2018
Schipper. Canadian FM. 2010
ACGME CSR Documents

Development of plans (and contingency plans)

Consider alternative Dx	Reflect on expected course	Delineate next steps
• Diagnostic “timeout” • Reconsider data	• Is it following that? • What to do if not?	• What if “X” happens? • How will change plan?



Recognize and diagnose	Coaching and practice	Application and review
Elaborating a management plan	Direct observation Chart stimulated recall	Give a commitment Script anticipated outcome and contingency plan

DX: elaborating a management plan

Tx:

Meet with Dr. Wolak to review 2 recent patient notes (admission or new patient in clinic)

Assign 2 cases per week with cases with decision points and have them bring a plan and contingency plan

Bring in literature to support contrasting management plans for 2 cases

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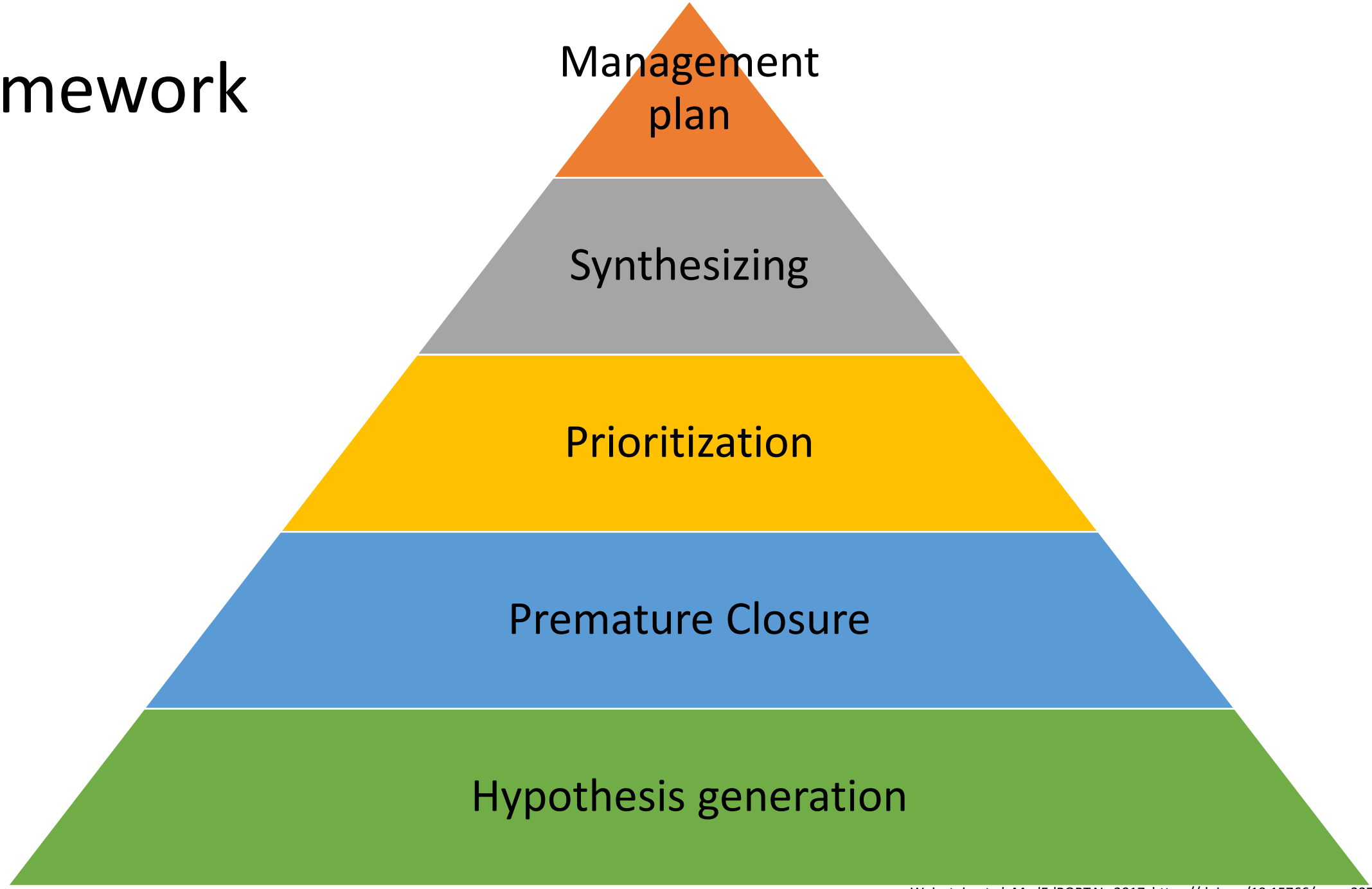
Case 5

Framework



Weinstein et al. MedEdPORTAL. 2017. https://doi.org/10.15766/mep_2374-8265.10650

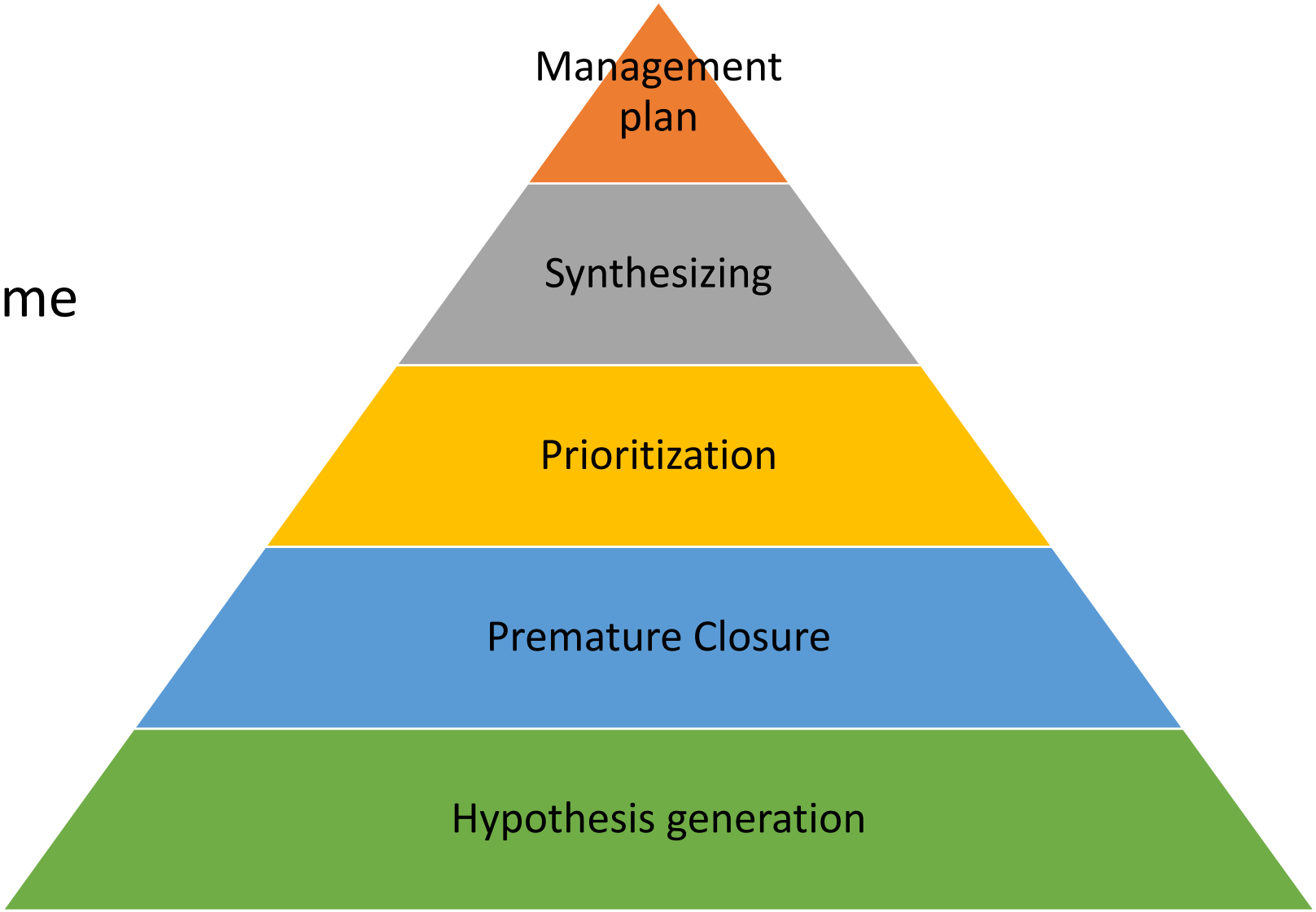
Primary Problem

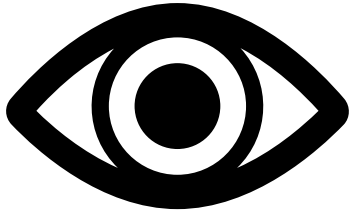
Remediation Strategy

????
(All of it….)

Where to start when there are LOTS of concerns?

- Lowest level
- Only 2-3 things at a time
- Longer course





Recognize and diagnose	Coaching and practice	Application and review
Multiple domains Start at the lowest – hypothesis generation	Direct observation Role play Assigned written cases to foster systemic generation of ddx	Leading and prioritized ddx Key features for comparisons Review documentation

- DX: Multidomain
  - Lowest: hypothesis generation and premature closure

- Tx:
- Meet with Dr. Vick to role play the last 2 patients seen in clinic
- Assign 2 cases/week to foster systemic generation of ddx
- Provide prompts to apply to cases and bring in 2 cases to review together

- Frequent follow up

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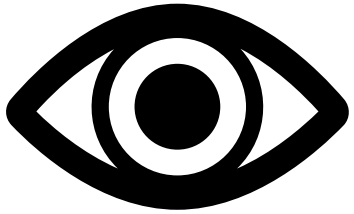
Take home points

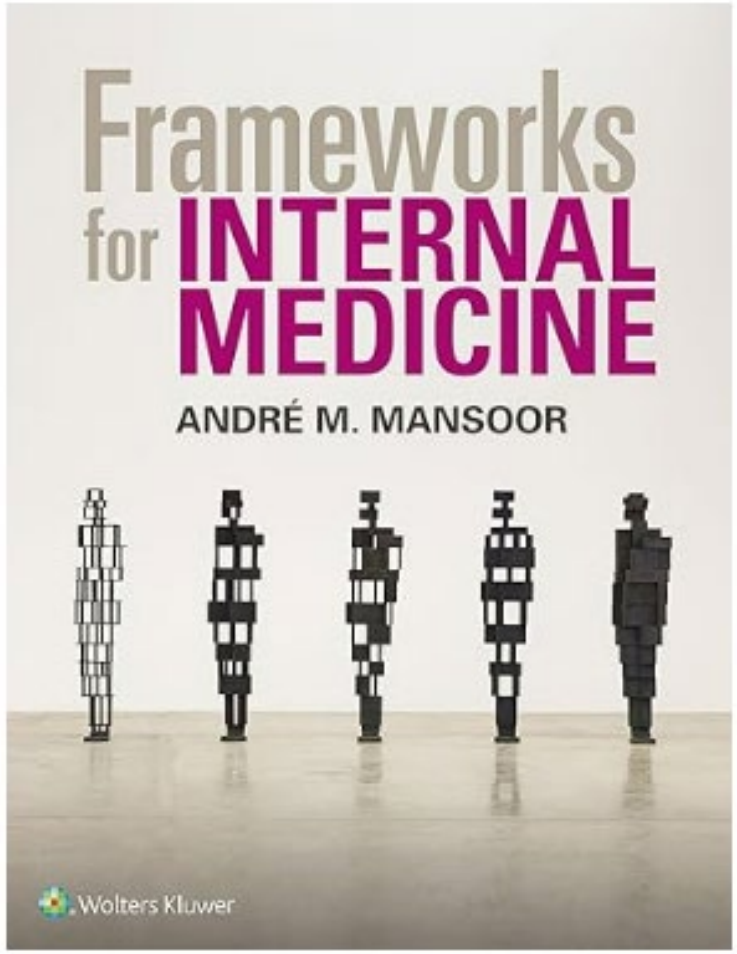
- Ensure you have the right diagnosis



- Craft a remediation plan to match the clinical reasoning domain

- Multi-domain or unsure where to start – work up the pyramid

References



***MedEdPORTAL* workshops with cases**:

- Weinstein A, Pinto-Powell R. Introductory Clinical Reasoning Curriculum. 2016;12:10370. https://doi.org/10.15766/mep_2374-8265.10370
- Weinstein A, Gupta S, Pinto-Powell R, Jackson J, Appel J, Roussel D, Daniel M. Diagnosing and Remediating Clinical Reasoning Difficulties: A Faculty Development Workshop. 2017;13:10650. https://doi.org/10.15766/mep_2374-8265.10650
- Levin M, Cennimo D, Chen S, Lamba S. Teaching Clinical Reasoning to Medical Students: A Case-Based Illness Script Worksheet Approach. 2016;12:10445. https://doi.org/10.15766/mep_2374-8265.10445
- Battista A, Konopasky A, Ramani D, Ohmer M, Mikita J, Howle A, Krajnik S, Torre D, Durning SJ. Clinical Reasoning in the Primary Care Setting: Two Scenario-Based Simulations for Residents and Attendings. 2018;14:10773. https://doi.org/10.15766/mep_2374-8265.10773