Promoting Diagnostic Reasoning in Learners

Denise M. Connor MD
Associate Professor of Clinical Medicine

Jeff Kohlwes MD, MPH
Professor of Clinical Medicine

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Disclosures

- No conflicts of interest to report

Learning Objectives

At the end of this workshop, you will be able to…

- Describe key components of a framework for teaching diagnostic reasoning

- Apply concrete strategies for coaching learners on their reasoning

- Name at least 1 opportunity for incorporating explicit reasoning teaching into your current clinical or classroom-based teaching
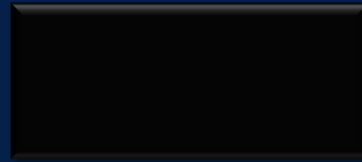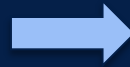
Workshop Agenda

- Introductions/Goals

- Didactic: Reasoning Framework

- Break Out Groups, Part 1

- Role Play

- Break Out Groups, Part 2

- Report Back & Discussion

- Commitments

Introductions & Goals

How do you currently teach your learners to reason through a case & arrive at a diagnosis?

→ → Lasix

➡️ ➡️ Lasix

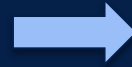# IMPROVING DIAGNOSIS IN HEALTH CARE

Script Theory—Origins

- Psychology Literature

  - Describe how we organize info

  - Predict performance, memory, info processing/speed

  - 1983: Clancey brings to medical literature

 - 1984: Barrows & Feltovich: CR model

Custers, E. J. (2015) ; Barrows H.S., Feltovich P.J. (1987)

'Real Life Scripts' to Illness Scripts

- "Precompiled knowledge structures"
  - Use knowledge network to understand current situation
- Connects reasoning w/ pattern recognition
  - Enabling Conditions*; The Fault; Consequences
- Experts vs. Novices (Schmidt, Norman, Boshuzen)
- Impact of activating scripts
  - Differential memory & processing speed of typical vs. atypical findings
  - "Default Values"

Custers, E. J. (2015);Charlin, B., et al. (2000)

Data Gathering

Test possible **scripts**

Explore **dx categories**

Process *the hx*
See the forest
for the trees
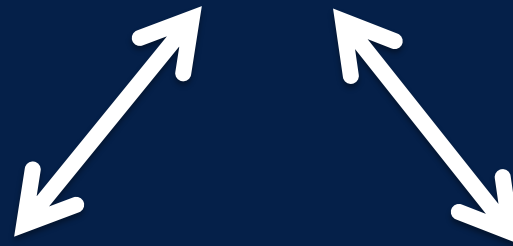
Search/Select Illness Scripts

Problem Representation

Identify candidate **scripts**

Activate **Schema**

Goals

- Make the process EXPLICIT

- SLOW things down

- TARGET coaching/feedback

Processing & Early Problem Representation

"I'm having this weird feeling when I pee – it's hard to describe, but it hurts, so much that I really dread going, and it seems like I have to go all the time. It started a couple of days ago. I'm afraid to even go out of my house because I know I'll need to go to the bathroom at any minute."

Name it

to tame it
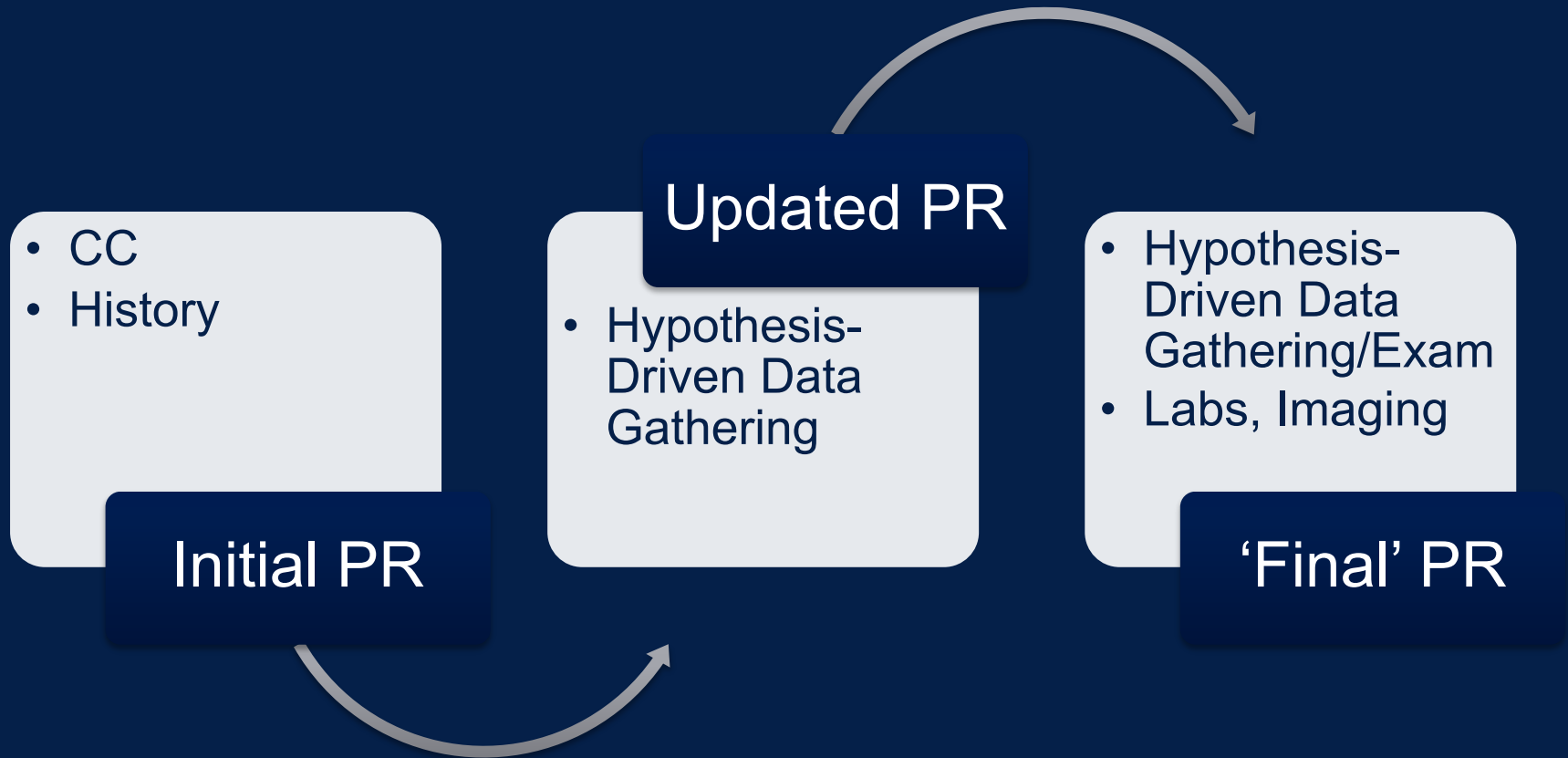
Acute dysuria and frequency

PR Ingredients

▪**Who** is this patient?

  • *Relevant* predisposing factors

▪**What**: clinical syndrome?

  • Signs/Symptoms *(Key & Differentiating)*

▪**When**: time course/tempo?

PR as a Mental Tool

PR Evolves & Feeds Forward

Initial PR
- CC
- History

Updated PR
- Hypothesis-Driven Data Gathering

'Final' PR
- Hypothesis-Driven Data Gathering/Exam
- Labs, Imaging

Updating the PR

Vaginal Bleeding

Vaginal Bleeding 7 wks after the LMP

Cough

Chronic, productive cough in a smoker

Problem Representation is Critical

Illness Scripts

WHO? WHAT?

WHEN? WHY?

Community Acquired Pneumonia

WHO   Risk incr w/ age, recent viral URI, structural lung dx, immunodeficiency

WHAT   Fever, productive cough, shortness of breath, tachycardia, hypoxemia

WHEN   Acute, progressive if untreated

WHY   Infection of lower respiratory tract; Strep Pneumo most common bug

Dx   Infiltrate on CXR, can be fooled if dry; Leukocytosis w/ left shift

Rx   Depends on host & severity; ceftriaxone/doxy first line

Can encode errors; Increasingly elaborated...

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Teaching & Learning Vertically: C/C

	Pre-disposing Factors	Clinical Consequences	Time course	Pathophys
CAP				
PE				
Acute Interstitial PNA				

Oral Presentation/ Note

Final PR → Summary Statement → Justification of Prioritized Ddx
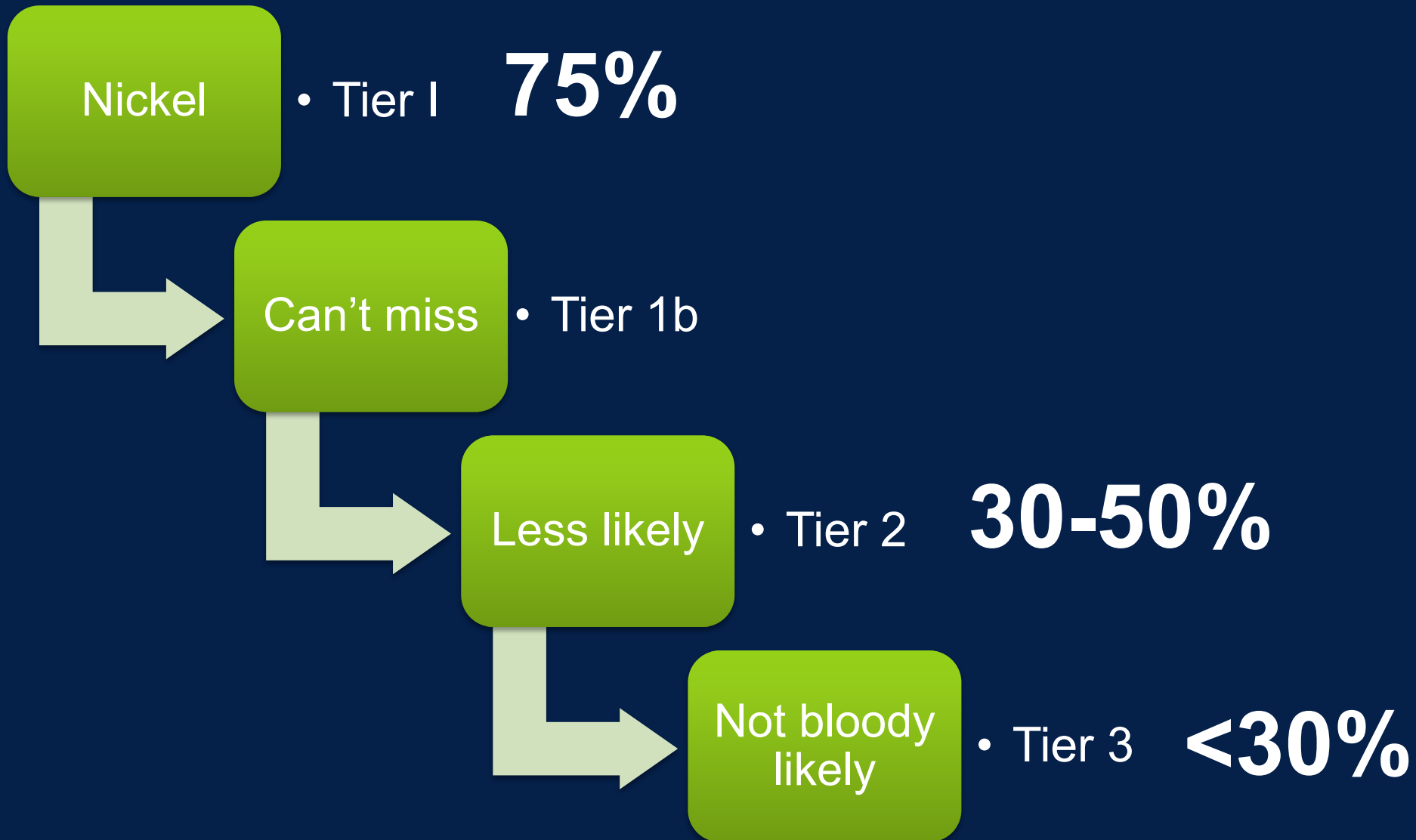
"The differential is broad and includes pheochromocytoma, sepsis, hyperthyroidism, alcohol withdrawal, anxiety disorder, or pulmonary embolism."

Prioritized Ddx + *Think Aloud*

Nickel
- Tier I   **75%**

Can't miss
- Tier 1b

Less likely
- Tier 2   **30-50%**

Not bloody likely
- Tier 3   **<30%**

How Do We Coach Learners to Build or Expand a Differential?
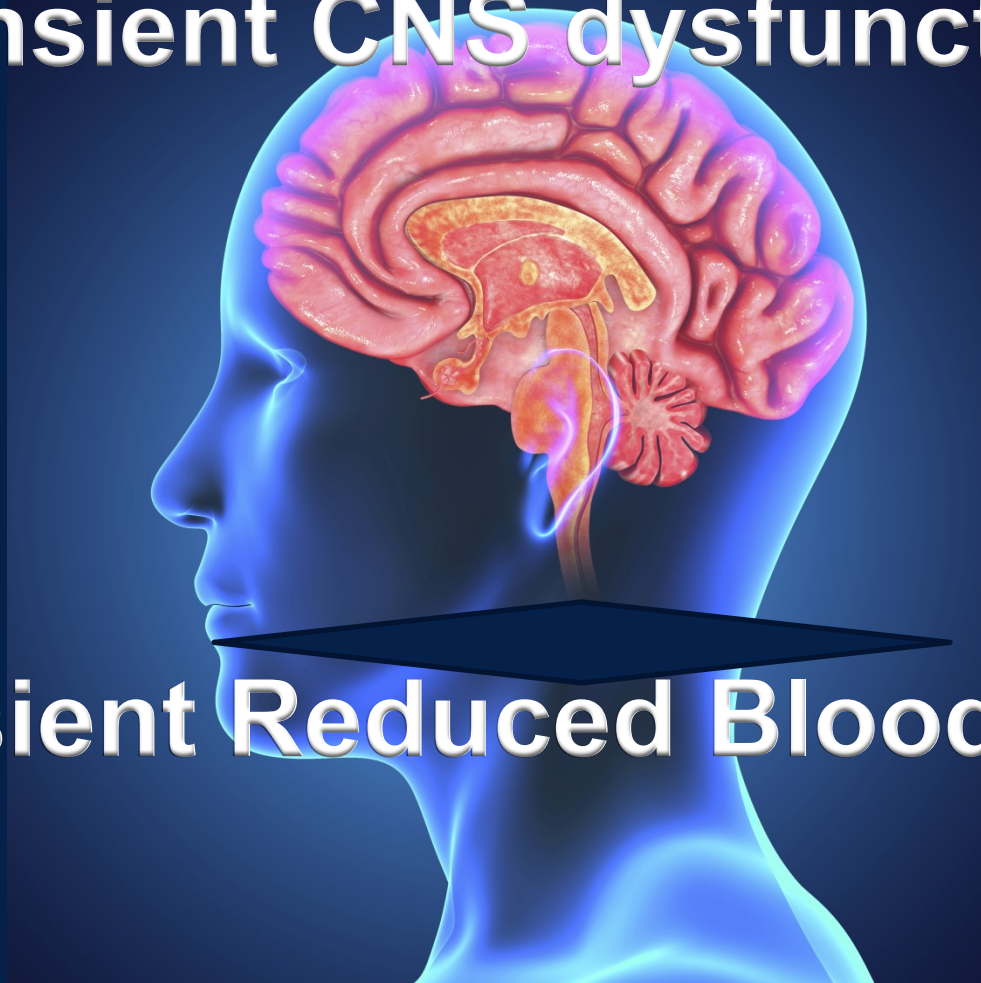
Diagnostic Schema

↓

What's your approach to…

Transient Loss of Consciousness

Transient CNS dysfunction

Transient Reduced Blood Flow

Transient Reduced Blood Flow

Transient CNS Dysfunction

Pump problem *(Cardiac)*	Wiring problem *(Reflex-mediated)*	Blood volume problem *(Orthostatic)*	Primary brain problem *(Neurologic)*	Other

How Do We Use Schema?

- Preparing before the H&P (esp early learners)

- When writing a note (dx time out)

- Coaching learners (build from baseline knowledge)

Key Concepts

- Problem Representation → Summary Statement

- Illness Script

- Prioritized Differential Diagnosis

- Diagnostic Schema

- 'Think Aloud'

Questions/Comments?

Making it Real: CR Coaching In Practice

- https://vimeo.com/227340104/17b1a37e2f

Break Out Groups, Part 1

- Read case 1 *(A/P only);* Discuss prompts

- We'll try out your strategies with a role-play in the large group

Brief Role Play & Discussion

Break Out Groups, Part 2

- Read case assigned to your table & discuss prompts

- Identify a spokesperson

- Return to the large group to share

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Report Back & Discussion

PR / Summary Statement Coaching

- Core PR clear? Specific? Accurate?
- PR sufficiently elaborated?
- Ingredients?
- Distractors?
  - Rule of 7
- Key/differentiating features?
- Abstract/Medical language?
  - Medical terms & "Semantic qualifiers"

Illness Script Coaching

- Use compare/contrast

  - How does X differ from Y?

- Use prioritization

  - Why would X be more likely than Y here?

- Cluster related diagnoses

  - When you think about X, what other 1-2 dx do you always consider?

- Call out mimickers

  - What less common dx can mimic X? How do they differ?

Schema Coaching

- Build from where learner is

  - Start with their big buckets, add 1-2 add'l features

  - Avoid the download

- Connect to pathophys/mechanistic thinking

  - Let's go back to first principles…
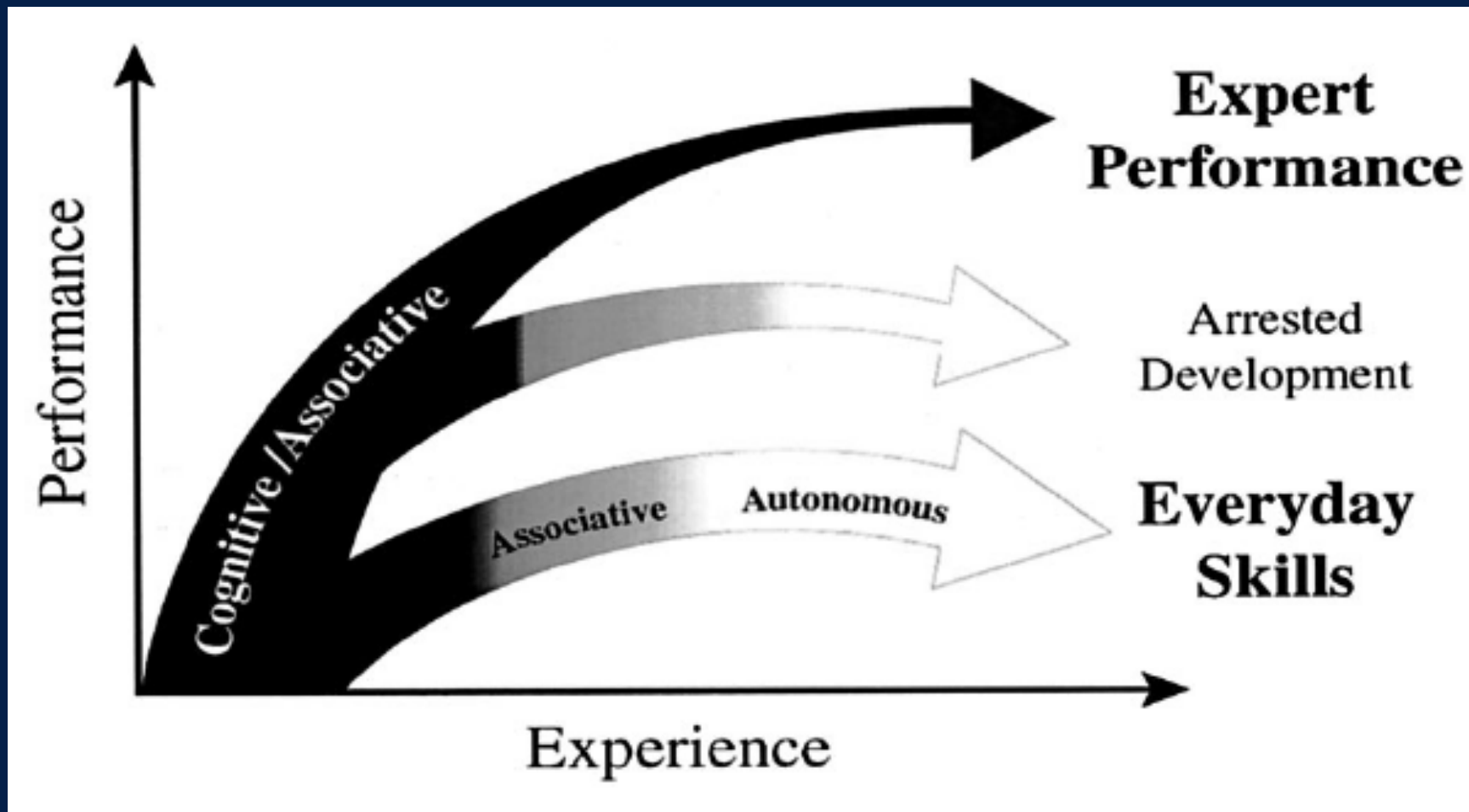
- Use analogy

  - If MK limited, is there a real-world example you can draw on?

Using Risk of Dx Error in Teaching

- Continuously improve/expand illness scripts

- Reflective Practice

- 'Combined Reasoning'

- Think out loud

- Noting high-risk situations → the 'diagnostic time-out'

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Key Topics for another day…

- Implicit/Unconscious Social Bias

  - Self-awareness, Purposeful individuation of patients, Empathy, Stereotype Replacement, Counting

- Bayesian Reasoning

Take Homes

- Share reasoning framework/language

- Use the framework to identify weaknesses

- Identify opportunities for reasoning coaching

Make a Commitment

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Works Cited

- National Academies of Sciences, Engineering, and Medicine. 2015. *Improving diagnosis in health care.* Washington, DC: The National Academies Press.

- Barrows, H. S., & Feltovich, P. J. (1987). The clinical reasoning process. *Medical education*, *21*(2), 86-91.

- Custers, E. J. (2015). Thirty years of illness scripts: Theoretical origins and practical applications. Medical teacher, 37(5), 457-462.

- Charlin, B., Tardif, J., & Boshuizen, H. P. (2000). Scripts and medical diagnostic knowledge: theory and applications for clinical reasoning instruction and research. Academic Medicine, 75(2), 182-190.

- Custers, E. J., Regehr, G., & Norman, G. R. (1996). Mental representations of medical diagnostic knowledge: a review. Academic Medicine, 71(10), S55-61.

- Ericsson, K. A. (2004). Deliberate practice and the acquisition and maintenance of expert performance in medicine and related domains. Academic medicine, 79(10), S70-S81.

Other References

- Bowen, J. L. (2006). Educational strategies to promote clinical diagnostic reasoning. New England Journal of Medicine, 355(21), 2217-2225.

- Rencic, J., Trowbridge, R. L., Fagan, M., Szauter, K., & Durning, S. (2017). Clinical reasoning education at US medical schools: results from a national survey of internal medicine clerkship directors. Journal of General Internal Medicine, 32(11), 1242-1246.

Resources

- *Journal of General Internal Medicine* Exercises in Clinical Reasoning Series: http://www.sgim.org/web-only/clinical-reasoning-exercises and https://clinicalreasoning.org

- Society to Improve Diagnosis in Medicine: http://www.improvediagnosis.org

- Podcasts: https://clinicalproblemsolving.com, http://imreasoning.com, https://thecurbsiders.com

- Catherine Lucey's Coursera Course – "Clinical Problem Solving"

- Clinical Reasoning Framework Videos made for Bridges students: https://www.youtube.com/watch?v=acJspBatjJE&t=362s, https://www.youtube.com/watch?v=ApSNehBFQak&t=4s, https://www.youtube.com/watch?v=cbbj8eo6niQ&t=2s

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Questions/Feedback?

Denise.Connor@ucsf.edu

Jeff.Kohlwes@ucsf.edu

Ashashyou

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