Promoting Diagnostic Reasoning in Learners

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http://www.ucsfcme.com/MedEd21c/

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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?
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IMPROVING DIAGNOSIS IN HEALTH CARE

QUALITY CHASM SERIES
The National Academies of SCIENCES • ENGINEERING • MEDICINE
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”

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
"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

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 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.
# Teaching & Learning Vertically: C/C

<table>
<thead>
<tr>
<th>Pre-disposing Factors</th>
<th>Clinical Consequences</th>
<th>Time course</th>
<th>Pathophys</th>
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<tr>
<td>CAP</td>
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<td>PE</td>
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<td>Acute Interstitial PNA</td>
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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 1
  - 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

- **Pump problem** *(Cardiac)*
- **Wiring problem** *(Reflex-mediated)*
- **Blood volume problem** *(Orthostatic)*

### Transient CNS Dysfunction

- **Primary brain problem** *(Neurologic)*
- Other

**Other Structural**
- Vasovagal
- Dehydration
- Seizure
- Arrhythmia
- Situational
- Bleeding
- TIA
- Carotid Sinus
- Hypersensitivity
- Migraine

**Transient Reduced Blood Flow**

**Transient CNS Dysfunction**
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
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?
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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’
Expert Performance

Arrested Development

Everyday Skills

Experience

Cognitive/Associative

Associative

Autonomous

Performance
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
Works Cited


Other References


Resources


- Society to Improve Diagnosis in Medicine: [http://www.improvediagnosis.org](http://www.improvediagnosis.org)


- 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=acJspBatjJE&t=362s), [https://www.youtube.com/watch?v=ApSNehBFQak&t=4s](https://www.youtube.com/watch?v=ApSNehBFQak&t=4s), [https://www.youtube.com/watch?v=cbbj8eo6niQ&t=2s](https://www.youtube.com/watch?v=cbbj8eo6niQ&t=2s)
Questions/Feedback?

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