Making the Invisible Visible

Denise M. Connor MD
Associate Professor of Clinical Medicine

Jeff Kohlwegs MD, MPH
Professor of Clinical Medicine

http://www.ucsfcmeme.com/MedEd21c/

#UCSFMedEd21
Disclosures

- No conflicts of interest to report
Learning Objectives

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

- Describe a framework for teaching diagnostic reasoning
- Apply concrete strategies for coaching learners on their reasoning
- Name at least one opportunity for incorporating explicit reasoning coaching into your current teaching
Workshop Agenda

- Welcome & Intros
- Didactic: Reasoning Framework
- Break Out Groups
- Report Back
- Challenges & Opportunities
- Commitments
How did you learn to reason through a case & arrive at a diagnosis?
Our Goal
Script Theory–Origins

Psychology Literature

- Describes how we organize info
- Predicts performance
- Predicts information processing/speed
- 1983: Clancy brings to medical literature

‘Real Life Scripts’ to Illness Scripts

- Feltovich & Barrows (1984)
- Sequences of events, “precompiled knowledge structures”
- Cross-over findings
  - Memory w/ typical vs. atypical findings
  - Processing speed
- Connects reasoning + pattern recognition
  - Enabling Conditions*
  - The Fault
  - Consequences

Custers, E. J. (2015)
Scripts as an Explanatory Model

- Application to Expertise (Bordage, Zacks, Cantor)
  - ‘Tuning’ scripts to practice
  - Knowledge structures of experts differ from novices
  - Knowledge is refined/processed
- Incorporates varied expression of illness
  - Dx as linked w/ weighing uncertainty
  - Real-world variation in disease expression
- Caveat: different specialties (or even different dx) may be better described w/ different models (prototype, instance models)

Diagnosis as Categorization

- Scripts = knowledge networks adapted for clinical care
  - Use prior network of knowledge (a script) to understand current situation
  - Triggered automatically/unconsciously by recognizing relevant features
  - Allow us to build an interpretation of the situation & then test
  - Default values (fill in rest of the picture once we have enough evidence)
  - Scripts as memory organizers

Charlin, B., et al. (2000)
Data Gathering

Test possible scripts

Search/Select Illness Scripts

Process the hx
See the forest for the trees

Problem Representation

Activate Schema
Identify candidate scripts
We are not only making things **EXPLICIT**, we are also **SLOWING** things down to a speed that allows learners at different stages to see/follow/understand/learn
“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.”

Acute dysuria and frequency
Problem Representation Evolves & Feeds Forward

- History

- Hypothesis-Driven Data Gathering

- Hypothesis-Driven Data Gathering/Exam
  - Labs, Imaging

- Updated PR

- Initial PR

- Final PR
Updating the Problem Representation

<table>
<thead>
<tr>
<th>Early</th>
<th>Later</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vaginal Bleeding</td>
<td>Vaginal Bleeding 7 wks after the LMP</td>
</tr>
<tr>
<td>Cough</td>
<td>Chronic, productive cough in a smoker</td>
</tr>
<tr>
<td>Knee pain</td>
<td>Chronic symmetric polyarticular arthritis</td>
</tr>
</tbody>
</table>
Why is a Good Problem Representation Crucial?
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

---

*Increasingly elaborated...*
Teaching Vertically: CC

<table>
<thead>
<tr>
<th>Predisposing Factors</th>
<th>Clinical Consequences</th>
<th>Time course</th>
<th>Pathophys</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asthma Exacerbation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Croup</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Foreign Body</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Oral Presentation/Note

Final PR → Summary Statement → Justification of Prioritized Ddx
The One-Liner, Assessment, Summary Statement
52yo woman w/ metastatic breast cancer with acute pleuritic chest pain, dyspnea, and SIRs with a clear lung exam and asymmetric lower extremity edema.
52yo post-menopausal woman w/ hypertension, PTSD, diet controlled diabetes, abdominal incisional hernia, and hypercholesterolemia presenting with fatigue, weakness, and dizziness.
Components

- **Who** is this patient?
  - *Relevant* predisposing factors
- **What** is the clinical syndrome?
  - Signs/Symptoms
- **When** is the time course/tempo?
Why Do We Care?

Synthesize → Develop Ddx → Prioritize → Make a Case
“The differential is broad and includes pheochromocytoma, sepsis, hyperthyroidism from Grave’s disease, alcohol withdrawal, anxiety or panic disorder, pulmonary embolism, myocardial infarction, or atrial fibrillation.”
Prioritized Ddx

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

- **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
Questions/Thoughts?
Break Out Groups

• Read case aloud in your group (*A/P only*)

• Brainstorm strategies to answer prompts

• Repeat with additional cases

• Select a group member to summarize & report-back to the larger group
Report Back & Discussion
Problem Representation / 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?
Bias

Heuristics

Implicit Bias

Humility

Fatigue

Reflection

Experience

Reflection and Experience are balanced against Implicit Bias and Fatigue.
Using Risk of Dx Error in Teaching

- Continuously improve/expand illness scripts
- Reflective Practice
- ‘Combined Reasoning’
- Think out loud
- Pointing out high-risk situations → slowing down
Topics for another day…

- Implicit/Unconscious Social Bias

- Self-awareness, Purposeful individuation of patients, Empathy

- Bayesian Reasoning
Make a Commitment
Take Homes

- Reasoning framework/language
- Using the framework to identify weaknesses
- Opportunities/options for reasoning coaching
Works Cited


Other References


Resources

- Bridges F2 Faculty Development Page (CR Framework Videos): [http://meded.ucsf.edu/foundations-2-resources](http://meded.ucsf.edu/foundations-2-resources)


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

- Catherine Lucey’s Coursera Course – “Clinical Problem Solving”
Questions/Feedback?

Denise.Connor@ucsf.edu
Creative Commons License

Attribution-NonCommercial-Share Alike 4.0 International License

You are free:
• to Share — to copy, distribute and transmit the work
• to Remix — to adapt the work

Under the following conditions:
• Attribution. You must give the original authors credit (but not in any way that suggests that they endorse you or your use of the work).
• Noncommercial. You may not use this work for commercial purposes.
• Share Alike. If you alter, transform, or build upon this work, you may distribute the resulting work only under a license identical to this one.

See http://creativecommons.org/licenses/by-nc-sa/3.0/ for full license.

This work by Denise M. Connor is licensed under a Creative Commons Attribution-NonCommercial-Share Alike 4.0 International License