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

Part 2
Introductions

• [insert your name, title and qualifications here]
Objectives

- Illustrate and implement targeted strategies to help learners with clinical reasoning deficits

- Practice incorporating strategies for teaching trainees clinical reasoning into everyday work flow through the use of a clinical case and role play
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
TREAT:
General Techniques for Reducing Diagnostic Error
Small Group Activity #1

- What are some specific techniques you have used to incorporate clinical reasoning into your teaching practice or rounds?

- What are the biggest barriers to accomplishing this?

- How have you overcome these barriers?
Explicitly Describe Heuristics and How They Affect Clinical Reasoning
Perform a Diagnostic Time-out

• Stop and pause
• Take a “Diagnostic Time Out”
  • Re-examine the data available without framing it with the current diagnosis
  • Re-build the differential from the ground up
Checklist

HIGH RISK SITUATIONS FOR DIAGNOSTIC ERROR
(A “Yes” response to any of the questions puts you at high risk for error)

- Is there a “must-not-miss” diagnosis that needs consideration?
- Did I just accept the first diagnosis that came to mind?
- Was the diagnosis suggested to me by the patient or another provider?
- Is there data about this patient I haven’t obtained or reviewed?
- Are there any pieces that don’t fit?
- Did I review the information myself?
- Was the patient seen in the ER/clinic recently for the same problem?
- Is this a patient I don’t like (or like too much) for some reason?
- Was this patient handed off to me from a previous shift?
- Was I interrupted, distracted, cognitively overloaded while evaluating this patient?

Graber ML et al. Prepared for the Agency for Healthcare Research
Promote the Practice of ‘Worst-Case Medicine’

- Particularly useful for learners who tend to experience anchoring bias or overconfidence.

Titanic
Promote Use of a Systematic Approach

- Especially useful for commonly seen diseases
- Consider creating illness scripts
- Use frameworks to help students generate comprehensive differentials in a systematic, organized manner
  - AKI
    - pre-renal/intrinsic/post-renal
  - Anemia
    - microcytic/normocytic/macrocytic
Ask ‘Why?’
Use Bayes Theory

- Explicit use of pre-test and post-test probabilities
- May prompt the learner to avoid premature closure or overconfidence
Encourage learners to find clinical data that doesn’t fit

- Ask learners ‘what can’t we explain?’
- Allows learners to expand their differential and limit anchoring and overconfidence
Role Modeling

Introduction

• Take learner through case and explain explicitly how you came up with the diagnosis

Understand

• Role model asking thesis-driven questions at the bedside

Diagnose

• Show learners how you critically think about a case

Treat

• Acknowledge biases

Conclusion
Admit your mistakes

• One of the most powerful ways to teach clinical reasoning

• If there was a missed diagnosis, go through the case with the team and discuss in detail where errors were made
TREAT:
Targeted Techniques for Reducing Diagnostic Error
Clinical Reasoning Process

Data Acquisition and Hypothesis Generation

Problem Representation

Illness Script Selection; Diagnosis and Treatment

Introduction

Understand

Diagnose

Treat

Conclusion
Data Acquisition/Hypothesis Generation

**Step 1:** Ask the trainee to come up with a broad differential based on the patient’s chief complaint

**Chief Complaint:** 50 yo man w/ fevers
Step 2: Ask the trainee to refine the differential based on receiving additional information about the patient.

Chief Complaint: 50 yo man w/ ESRD on HD here with fevers x 5 days, malaise x 8 days and subacute cough.

Diagram:
- Infection: Bacteremia, cellulitis, pneumonia, UTI
- Rheum: Lupus
- Other: Cancer, PE/DVT
Step 3: Ask trainee to come up with questions to ask the patient based on the differential they generated

Questions to ask patient based on chief complaint

**Bacteremia:** Any issues w/ dialysis?

**Pneumonia:** Productive cough? Sick contacts?

**Cellulitis:** Any extremity warmth or swelling?

**UTI:** Any dysuria? Polyuria? Odor? Prior UTIs?

**Lupus:** Any rash? Joint pain? Arthralgias?

**Cancer, PE/DVT:** Weight loss, night sweats, malaise

**PE:** Any long trips, pleuritic chest pain, leg swelling?

Step 4: Trainee can now ask the patient targeted questions that are thesis driven and appropriately related to the chief complaint
Helping learners synthesize data

### PROBLEM

<table>
<thead>
<tr>
<th>HPI</th>
<th>EXAM</th>
<th>DATA</th>
</tr>
</thead>
</table>
| **Fevers? Malaise?**  
  help student refine their problem if needed | **ESRD**  
  **Fevers x 5 days**  
  **Malaise x 8 days**  
  **Rhinorrhea and nonproductive cough 2 weeks ago** | **T 102; HR 110; RR 22**  
  **Lungs: Clear**  
  **CV: Systolic murmur**  
  **Skin: Osler Nodes*** | **WBC 22,000**  
  **CXR: infiltrates**  
  **Creatinine 3.0*** |

**Step 1:** Ask the trainee to circle or list the MOST pertinent items in each major section (HPI, physical exam, data)

- If the trainee misses important information, prompt them or tell them*
- If a trainee identifies irrelevant information, ask them to defend why they think it’s relevant**
Step 2: Ask trainee to draw connections between the items they highlighted.
Problem representation

- 50 yo man w/ h/o ESRD here w/ fevers likely secondary to PNA

- 50 yo man w/ IVDA and ESRD who presented with subacute onset fevers and found to have sepsis, a new murmur, Osler’s nodes and pulmonary infiltrates on exam.

Step 3: Ask trainee to revise their summary statement to reflect connections they created.

Semantic transformation
Helping learners expand their differential

<table>
<thead>
<tr>
<th>dDx for Sepsis</th>
<th>Supporting Evidence</th>
<th>Refuting Evidence</th>
<th>Rank</th>
<th>Additional Info?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pneumonia</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>AVF infection</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Endocarditis</td>
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</tbody>
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**Step 1:** Ask the trainee to identify the primary problem
**Step 2:** Ask the trainee to list a differential diagnosis for the problem
### Helping learners expand their differential

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<th>Rank</th>
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</tr>
</thead>
<tbody>
<tr>
<td><strong>Pneumonia</strong></td>
<td>+ Cough + Multiple infiltrates on CXR</td>
<td>Cough is nonproductive No sick contacts Cough occurred 3 weeks ago Lung exam is benign</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>AVF infection</strong></td>
<td>+ ESRD w/ an AVF</td>
<td>AVF site not tender or red No issues using AVF; good thrill</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Endocarditis</strong></td>
<td>+ Fevers + Holosystolic murmur + Osler nodes + IVDA</td>
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</tbody>
</table>

**Step 3:** Ask trainee to list supporting and refuting factors based on history, exam and data for each item on the differential
### Helping learners expand their differential

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</tr>
</thead>
<tbody>
<tr>
<td>Pneumonia</td>
<td>+ Cough</td>
<td>Cough is nonproductive</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>+ Multiple infiltrates on CXR</td>
<td>No sick contacts</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
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<td></td>
</tr>
<tr>
<td>Endocarditis</td>
<td>+ Fevers</td>
<td></td>
<td>1</td>
<td></td>
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<td></td>
<td>+ Holosystolic murmur</td>
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<td>+ Osler nodes</td>
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**Step 4:** Ask the trainee to rank each item on the differential based on supporting/refuting evidence
### Helping learners expand their differential

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<tbody>
<tr>
<td>Endocarditis</td>
<td>+ Fevers</td>
<td></td>
<td>1</td>
<td>Blood cultures?</td>
</tr>
<tr>
<td></td>
<td>+ Holosystolic murmur</td>
<td></td>
<td></td>
<td>TTE?</td>
</tr>
<tr>
<td></td>
<td>+ Osler nodes</td>
<td></td>
<td></td>
<td>Ask radiology to re-read CXR</td>
</tr>
<tr>
<td></td>
<td>+ IVDA</td>
<td></td>
<td></td>
<td></td>
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**Step 5:** Ask trainee to list additional information to help them confirm their diagnosis
Helping learners with Diagnosis

4 Step Clinical Reasoning Checklist

1) Summarize the patient in 1 – 2 sentences

2) Pick your pivotal element (main problem)

3) Gut diagnosis? 

4) 5 W’s 

Conclusion

Introduction

Understand

Diagnose

Treat
Helping learners with Diagnosis

The 5 W’s

• Why?
• What else could it be?
• What are my ‘can’t miss’ diagnoses?
• What’s my working/revised diagnosis?
• What’s the pre-test probability for my diagnosis?

  • If low or moderate:
    • What doesn’t fit?
    • What else could it be?
    • What additional info do I need?

• Ask patient additional ?s
• Review physical exam?
• Review labs?
• Order new tests/labs?
• Call a consult?
Small Group Activity #2: Treatment

• **Pick 3 clinical reasoning treatment strategies** and discuss how you would approach Jim to help him with his clinical reasoning deficits
  • Why did you choose these particular strategies?
  • What specific clinical reasoning deficit(s) are you trying to improve?

• **With a partner, practice utilizing at least one of the strategies**
  • Take turns playing the role of the intern (Jim) and the attending in order to address Jim’s clinical reasoning deficit(s)
Small Group Activity #2: Debrief

Introduction

• What specific clinical reasoning deficit(s) are you trying to improve?

Understand

• Why did you choose these particular strategies?

Diagnose

• How did the role play exercise go?

Treat

• What were some of the challenges associated with utilizing some of these techniques?

Conclusion
Take Home Points

Understand

- Dual Process Theory
- Cognitive Biases
- Clinical Reasoning Process

Treat

- Ask Scaffolding Questions to Prime your learner
- Employ General Strategies to Augment Clinical Reasoning Remediation
- Use Targeted Stepwise Approach to treat learners at each deficit level
References

- Bowen, J. Educational Strategies to Promote Clinical Diagnostic Reasoning. NEJM. 2006
- Fagan TJ. Nomogram for Bayes’ theorem. NEJM. 1975; 293:257
- McGee, S. Simplifying Likelihood Ratios. JGIM 2002;17:647-650