Clinical reasoning modeling in its whole complexity: Implications for teaching and remediation for the underachieving resident

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Introduction

Who are we?
Who are you?
Medical educators?
Educational directors?
Teachers?
Outside Canada?
From Canada?

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Goals of the workshop

• Remind clinical reasoning key concepts

• Present a model, based on analysis of clinicians’ cognition, that unveils the complexity and tacit aspects of clinical reasoning

• Discuss implications of this model for teaching and remediation for the underachieving resident

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Why a new model?

• There are many review articles on theories of clinical reasoning and on how to teach clinical reasoning
  
  (Eva, Nendaz, Norman, Charlin, Bowen)

• These highly theoretical concepts are difficult to transpose in actual clinical settings.
Why a new model?

- Clinical teachers are often unfamiliar with the complex body of literature and they tend to rely mainly on their practical knowledge as clinicians.

Kempainen, Dudek

Bourdy, Charlin, Audétat, 2011
Why a new model?

So we need:

• *To bridge the gap between theory and the reality of clinical practice*

• *Define models of clinical reasoning in a way to gain a better understanding of problems ...This will help to manage them more effectively...*

• *Provide educators with more/better tools*

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Why a new model?

But what about identification and remediation of difficulties in clinical reasoning?

• During clinical supervisions, clinical teachers quickly detect residents’ difficulties.

• The identification often remains – global – intuitive

(Hauer, Frellsen, Hicks)
Why a new model?

Like in clinical settings, the more accurate the diagnosis is in its comprehensive representation, the more the intervention plan will target and be adapted to the resident and the issue

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Overview

- Introduction
- Clinical reasoning, key concepts
- MOT a technology and a technique
- The MOT model of clinical reasoning
- Health break
- Application for learning and teaching
- Underachieving resident

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How did we proceed?

• 2 hours encounters, over two years
• A cognitivist extracted knowledge and modelized it graphically
• 6 clinicians (diverse specialties)
• Research group:
  Audétat MC, Caire-Fon N, Charbonneau A, Charlin B, Crevier F, Millette B, Bourdy C.
Clinical reasoning: Key concepts

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Clinical reasoning: definition

Clinical reasoning entails a multitude of cognitive processes that enable physicians to combine scientific information, clinical skills, and experiences with similar patients to make sense of a particular patient’s illness, and to determine the best action to cure or alleviate it.

K Montgomery: How Doctors Think, 2006
Salient concepts that emerged in the research process

- Hypothetico-deductive (analytical reasoning)
- Non analytical (Pattern recogn., memories of patients)
- Diagnosis versus categorisation
- Types of knowledge used in clinical encounters
- Semantic transformation of information
- Problem solving
- Problem representation
- Metacognition

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Cognitive process: Non-analytic, immediate process (system 1)

1. Pattern recognition (configuration of signs)

2. Memorization of instances

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Cognitive process:
Analytic process (system 2)

Hypothetico-deductive Process

- Patient information
- Hypothesis(es) generation
- Data interpretation
- Hypothesis(es) verification
- Final hypothesis(es)

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Diagnosis vs categorisation
Types of knowledge

- **Illness scripts**
  
  Charlin *et al.*, Med Ed, 2007

- **Encapsulated knowledge (bio-medico-social knowledge)**
  
  Boshuizen & Schmidt,
Semantic transformation
Problem representation and knowledge activation

When the patient says...

• I’m 58 y.o.
• I have a pain in my left knee
• That woke me this night at 3.20 a.m.
• The knee was big, red, and warm...

The MD thinks ...

• Middle-aged man
• Unilateral, big articulation of the inferior members
• Acute, nocturnal
• Inflammatory aspect, arthritis

Adapted from M Nendaz
Problem solving

Problem representation
Metacognition
MOT : Modelling using Typified Objects

A TECHNOLOGY AND A TECHNIQUE ...
**MOT** (Modelling using typified objects)

A software, a technique, a grammar

<table>
<thead>
<tr>
<th>Typology of objects</th>
<th>Typology of links</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concepts (What?)</td>
<td>C: A is composed of B</td>
</tr>
<tr>
<td>Procedures (How?)</td>
<td>S: A is a sort of B</td>
</tr>
<tr>
<td>Principles (Why? When?)</td>
<td>I/P: A is an Input or output of B</td>
</tr>
<tr>
<td></td>
<td>R: A Regulates/Governs B</td>
</tr>
</tbody>
</table>
Reading a MOT map: An example

Determine the objectives of the encounter

- Patient's request(s)
- Consultee's request(s)
- When establishing priorities, factors such as urgency, appropriateness, and efficiency must be considered
- Objective(s) of the encounter

- Initial data
- Clarify the patient's request(s) (explicit and implicit)
- Acknowledge the request(s) of the consultee or third party
- Identify the patient's needs
- Establish priorities

- Reason(s) for consultation
- Needs according to the consultee or third party
- The doctor's perception of the patient's needs
How did we proceed?

- 2 hours encounters, over two years
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- 6 clinicians (diverse specialties)
- Research group:
  Audétat MC, Caire-Fon N, Charbonneau A, Charlin B, Crevier F, Millette B, Bourdy C.
Health break ☺ ... 15 minutes

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What literature highlights...

The importance of identifying, reasoning out, objectivizing and defining the clinical-reasoning problem in order to gain a better understanding and determine the pedagogical objectives and remediation tools if any.

M. NENDAZ, B. CHARLIN et al., « Le raisonnement clinique: données issues de la recherche et implications pour l’enseignement » (Clinical reasoning: from research findings to applications for teaching) Pédagogie Médicale 2005;6:235-254
Discussion

Would this model be useful in your context for learning & teaching?

Small group discussion
15 minutes

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Discussion

You are supervising a resident
You notice “premature closure”
Would the model be useful to explain and help?
Premature closure

The learner:

- Quickly focuses on a single diagnostic hypothesis and conducts the interview superficially or directs it exclusively according to that hypothesis.
- Limits himself passively by failing to generate alternative hypotheses, or actively when he swiftly fixates on a single feature of the case.
Explaining...

In a training setting, clinicians must especially show metacognitive and clear knowledge with respect to their own professional expertise.

- Being aware of their knowledge and actions
- Being able to make clear and accessible the results of their approach but mostly the process and how the underlying knowledge is interrelated.

CHAMBERLAND M., HIVON R. “Les compétences de l’enseignant clinicien et le modèle de rôles en formation clinique” (competencies of teaching clinicians and the role model in clinical training), Pédagogie médicale 2005;6; 98-111
Discussion

You are supervising a resident
You notice “premature closure”
Would the model be useful to explain and help? How would you do it?

Small group discussion
15 minutes

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Premature closure: remediation

- Systematically ask learner to summarize the case and then to suggest alternative diagnoses. Ask learner to justify and prioritize diagnoses.
- Encourage the learner to proceed methodically by focusing on the justification of the main hypotheses.
- Encourage learner to reflect on why he failed to retain other hypotheses.
- Ask learner to read up on several diseases and compare and contrast them.
Discussion

Would this model be useful for detection and remediation of difficulties of reasoning?

Small group discussion
15 minutes

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More?

Thank you


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