

Effective Approaches to Teaching and Evaluating Clinical Reasoning Skills

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Traditional Clinical Learning

Case Presentation

Chief complaint

HPI

PE

Labs



**Differential
Diagnosis**

Did you have any
childhood illnesses?

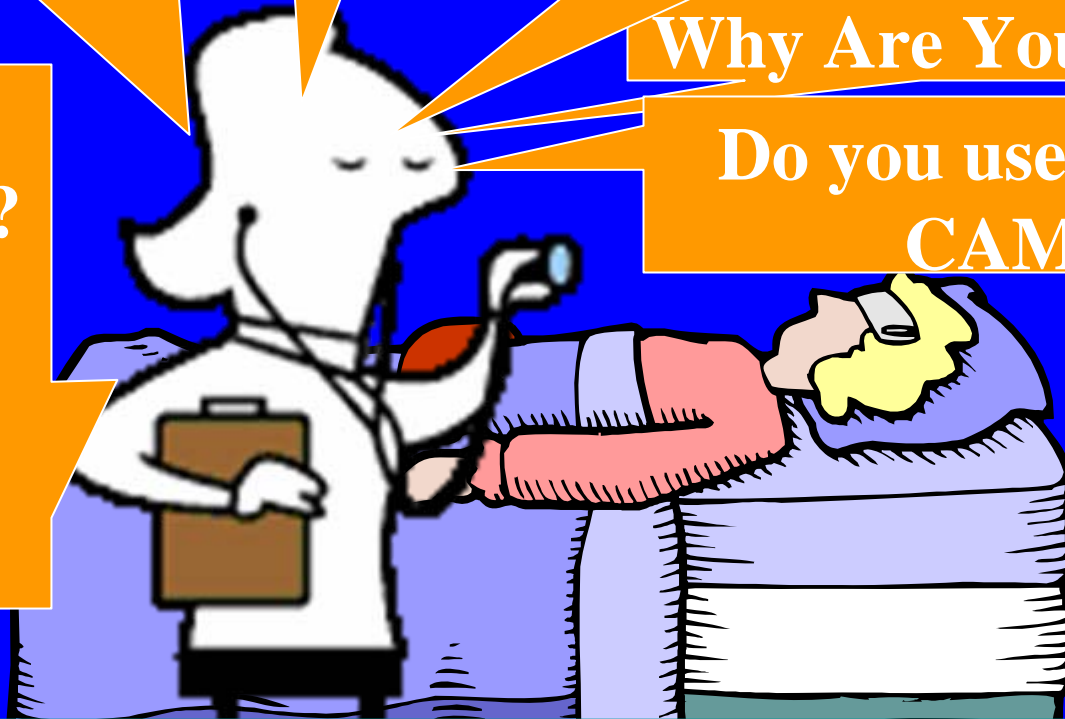
Do you have any N, V,
Diarrhea, Fever, Pain
w/Urination, SOB, CP?

Which Joints Hurt?

Travel?
Heartburn?
Allergies?
Surgeries?

Why Are You Here?

Do you use drugs?
CAM?

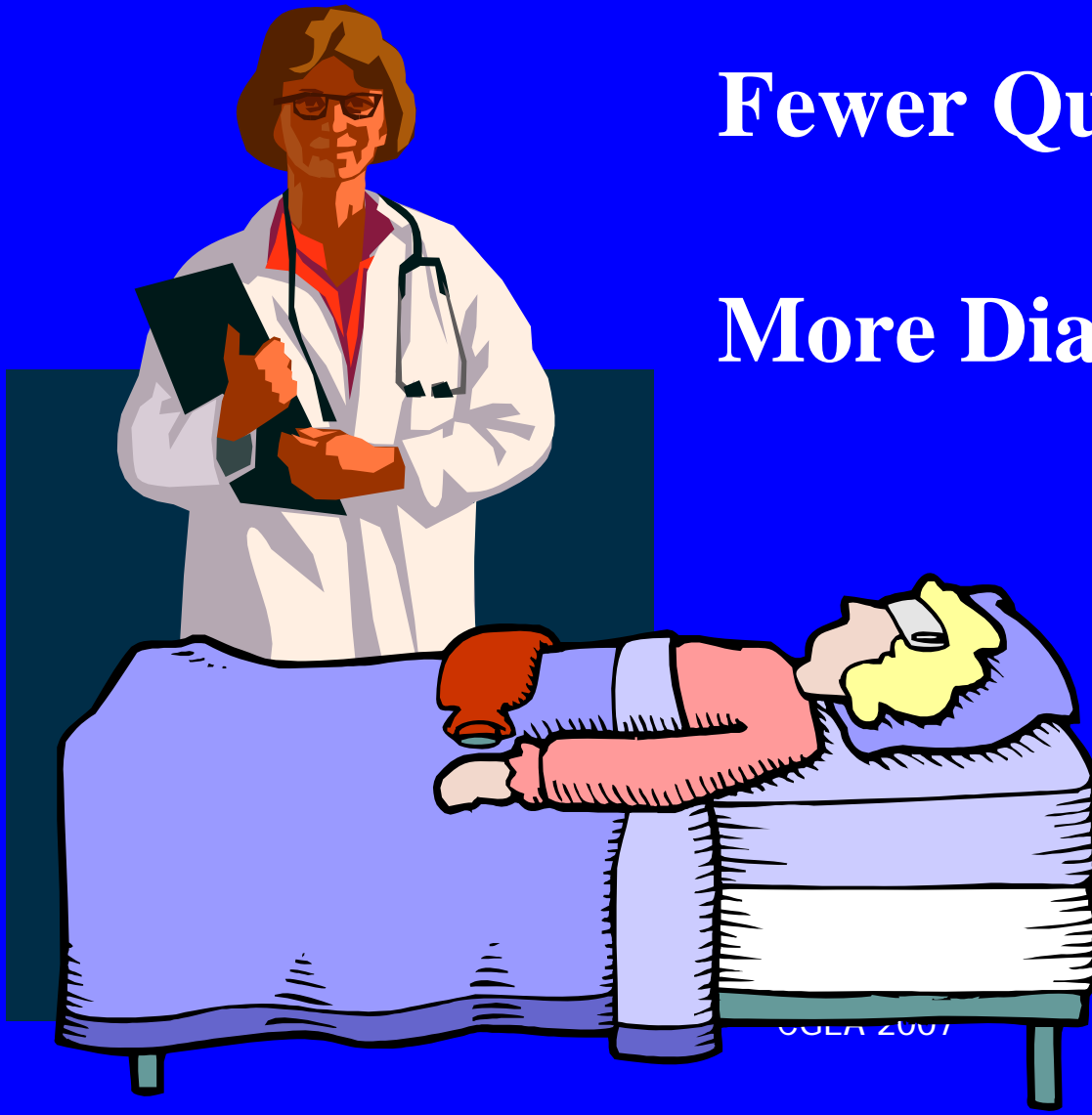


NOVICE DIAGNOSTIC REASONING

Expert Diagnostic Reasoning

Fewer Questions/Facts

More Diagnostic Accuracy



Knowledge Organization

- The development of sophisticated problem solving skills involves not only an increase in the number of facts but a change in the way those facts are stored and used.

Georges Bordage, MD PhD

Building Blocks of Problem Solving

Hypothesis Testing

Forward Thinking

Pattern Recognition

**Case: A 23 yo man with
a swollen ankle and rash**

Courtesy of preventive med@vanderbilt.edu



Novice Clinical Reasoning

A 23 yo presents with **Left ankle pain** for two days, severe enough to prevent walking. He has a low grade fever and a funny rash. He is an avid indoor tennis player, but never goes outdoors. He is sexually active w/o condoms. He had similar pain in his elbow last week and pain with urination 3 weeks ago which went away.

DDX:
Lyme Disease
Lupus
Reiter's Synd
Tendinitis
GC
Rheumatoid
Arthritis
Gout

Novice Clinical Reasoning

A 23 yo presents with **Left ankle pain** for two days. He has a low grade fever & a funny rash. He is an avid tennis player, but never goes outdoors. He is sexually active w/o condoms. He had similar pain in his elbow last week & transient pain with urination 3 weeks ago.

DDX:

~~Lyme Disease~~

~~Lupus~~

~~Reiter's Synd~~

Tendinitis

GC

Rheumatoid

Arthritis

Gout

Hypothesis Testing

- **Single Symptom driven**
- **Success dependent on initial DDX**
- **Limitations:**
 - law of clinical plausibility
 - all facts are created equal
 - Resulting lists are exhausting to deal with

Gout

Lupus

RA

Infec

Reiters

**Memory
Framework
for
Hypothesis
Testing**

Forward Thinking: Defining the Syndrome

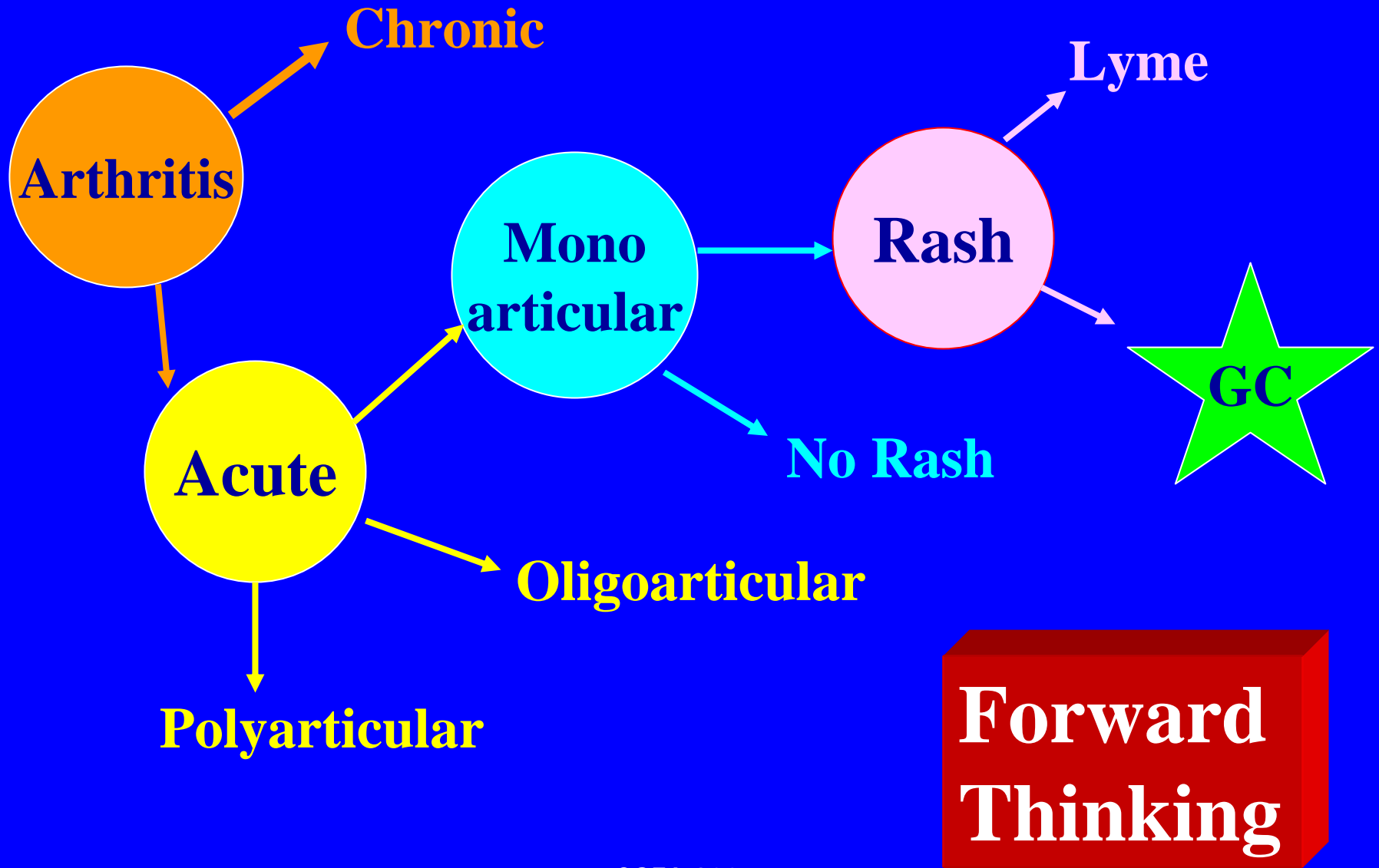
A 23 yo presents with **Left ankle pain** for **two days**. He has a low grade **fever** & a **funny rash**. He is an avid tennis player, but never goes outdoors. He is sexually active w/o condoms. He had similar pain in his **elbow** last week & transient pain with urination 3 weeks ago.

ACUTE

**Febrile
Oligoarthritis**

with Rash

Memory Framework for Forward Thinking



Forward Thinking

- **SYNDROME driven**
 - **Data gathering: define the syndrome**
- **More Efficient/Less data**
 - **each step excludes multiple diagnoses**
- **Key Skills Needed:**
 - Compare and Contrast Mentality**
 - Processing of Symptoms**

Processing

**Translate or abstract symptoms
into uniformly descriptive medical
terminology**

Descriptive Processing

- **Why?** “Medical-ese” facilitates recall, more precise
- **How?** Abstract Binary Oppositional descriptors
 - Temporal: acute vs chronic
 - Distributive: poly vs mono arthritis
 - Qualitative: arthralgia vs arthritis

Summative Processing

- **Combining the descriptors into a syndrome**
 - **Common Medical Syndrome (Shock, Flaccid tetraplegia)**
 - **Thematic summary (acute oligoarticular arthritis with rash)**
- **Prevents inappropriate emphasis on single component/symptom**

Pattern Recognition

- Disease driven
- Skills Required:

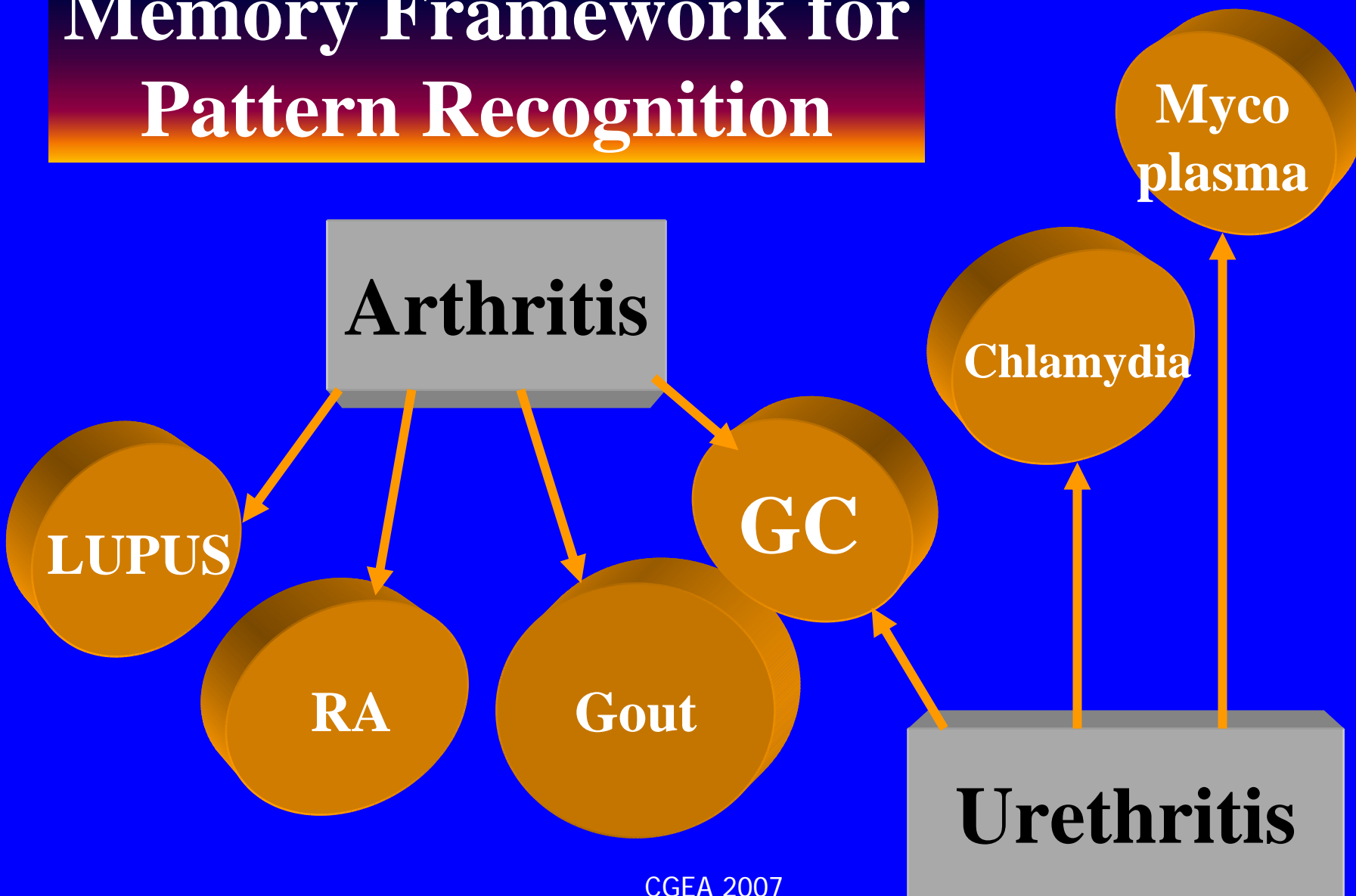
Processing

Compare and Contrast Mentality

Illness Scripts

Experience

Memory Framework for Pattern Recognition



Illness Scripts

Epidemiology

Sexually Active

Time Course

Acute

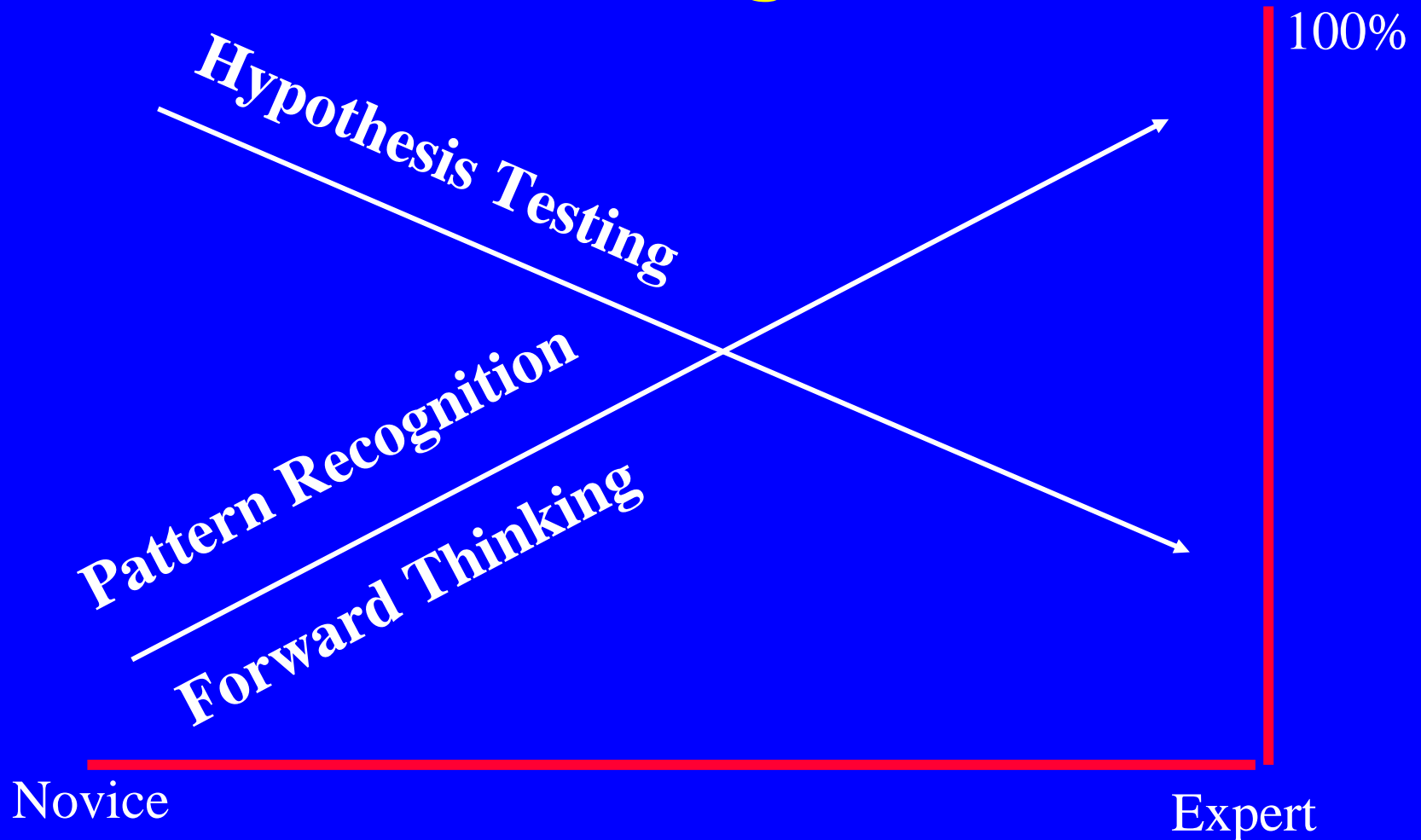
Descriptive
Syndrome

**Oligoarticular
Arthritis with
Rash**

Clinical Judgment

Recognizing the extent to which the patient's illness script matches the disease's illness script

Problem Solving Maturation



How does this help us?

What's in the black box?

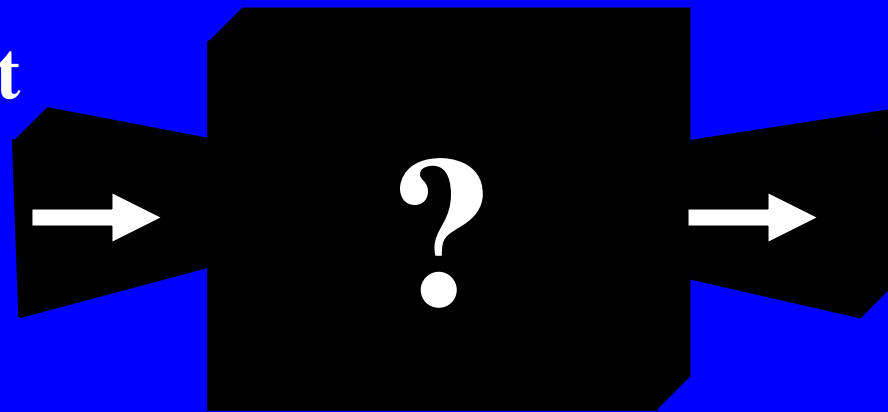
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**Differential
Diagnosis**

Structured Approach

Step 1: **Problem List**

Identify all problems or abnormalities in case

Process into uniformly descriptive medical terminology

Step 2:

Patient Illness Script

Process further to summary statement, identifying key ...

- Epidemiology
- Temporal pattern
- Syndrome statement

Step 3:

Prioritized Differential Diagnoses

Match patient's illness script to classic disease illness scripts

"Fit" determines the likelihood of diagnosis

Step I: Construct A problem list

- List all abnormalities
- **Process** and reduce by
 - **Combining redundant** items
 - Identifying “**due to's**”
 - Removing nonspecific items
 - List unrelated “other problems” at end
- Put in order of priority

Step II: Process to Patient Illness Script

- **Epidemiology:**
 - Select only those demographic/PMHx items relevant to the chief complaint
- **Temporal Pattern:**
 - Acute/Chronic; Progressive/Stable; Episodic; Biphasic.....
- **Syndrome statement:**
 - Processed and prioritized problems

Step III: On to Differential of Diagnoses

- List diseases under consideration (**DDX**)
- ID **Classic ILLNESS SCRIPT** of each
 - Assesses factual knowledge
- Which **fits** the Patient's illness script?
 - Assesses clinical judgment
 - Encourages auto correction
 - Demystifies pretest probability

Clinical Reasoning in Clinical Settings

The medical record

- Documentation of reasoning?
- Eighteen residents in IM or FM
- H & P or SOAP note
- Only 1/18 contained enough information to classify diagnostic reasoning

Baker et al. Ac Med 1999. 74:S13-15.

Examples

- "A/P: Abdominal pain- possible etiologies include GERD, partial SBO, urolithiasis, PUD, fibroids. Plan: will start patient on prilosec. If no relief, consider US abdomen."
- "A/P: Dizziness. No focal Neurologic deficits. ?TIA, ?electrolyte imbalance ?HTN. Plan: Check electrolytes, TSH, CBC. RTC 3 weeks."
- "24 year old with nausea initially relieved with food. 1. Gastroenteritis, 2. GERD. 3. PUD. Plan: Mylanta OTC for relief. If no relief f/u 2 weeks."

The IDEA Method

- I
 - D
 - E
 - A
- **Interpretive summary**
 - **Differential diagnosis**
 - **Commitment to diagnosis with Explanation of reasoning**
 - **Alternative diagnoses with explanation of reasoning**

Structural Semantic Theory

- **Bordage and Lemieux**
- **Role of knowledge organization in diagnostic reasoning**
- **Diagnostic accuracy**

Structural Semantic Theory

- **Reduced**
- **Dispersed**
- **Elaborated**
- **Compiled**

The RIME Framework

- Reporter
- Interpreter
- Manager
- Educator

Categories

- **Early (reduced) or dispersed reporter**
- **Good reporter**
- **Interpreter (elaborated)**
- **Manager/educator**

SUMMARY POINTS

Learning advantages of Stepwise approach

- Reinforces value of detailed clinical evaluation
- Emphasizes clinical judgment
 - Removes “could be” plausibility
- Encourages Auto-correction
- Facilitates Identification of individual learning needs

Knowledge Testing Benefits

- Dx questions on clinical tests rely on comparing and contrasting dz which can cause a common syndrome.
- Focus on key features helps students recognize that all facts aren't created equal.

Clinical Evaluation Benefits

- **Diagnose Learner**
 - Processing vs Synthesis
 - Knowledge vs Judgement
(prioritization/importance)
- **Provides language to describe**
 - RIME
 - Dispersed, reduced logic

Questions?