

Clinical Problem-Solving in FP

“Diagnostic process”



Aims

- **Diagnostic Strategies in Clinical Practice**
 - Hospital vs family practice
 - Hypothetico-deductive model
- **Why Order a test? a diagnostic test?**
- **Sources of error in the diagnostic process**
- **Test characteristics: sensitivity, specificity, likelihood ratios.**





Reflections...

Sir McKenzie - 1973

“I had not long been in the practice when I discovered how *defective* was my knowledge. I left college under the impression that every patient's condition could be diagnosed. For a long time, I strove to make a diagnosis and assiduously studied my lectures and textbooks, without avail.



Reflections...

For some years, I thought that this inability to diagnose my patients' complaints was due to *personal defects*, but gradually, through consultations and other ways, I came to recognize that the kind of information I wanted *did not exist....*”

Mackenzie (Mair 1973)



Why?

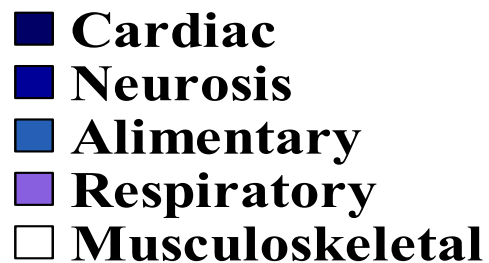
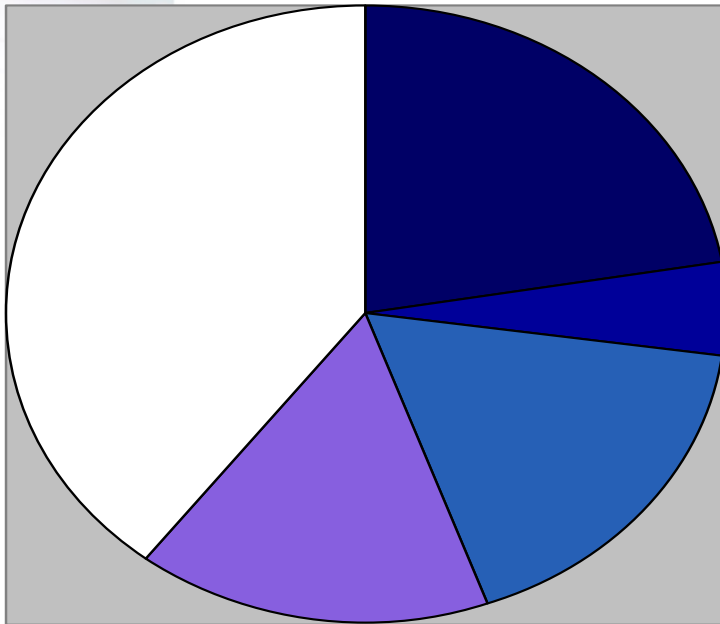
- Pattern of illness: Community vs hospital



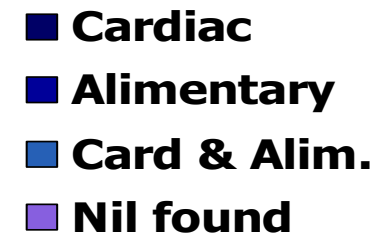
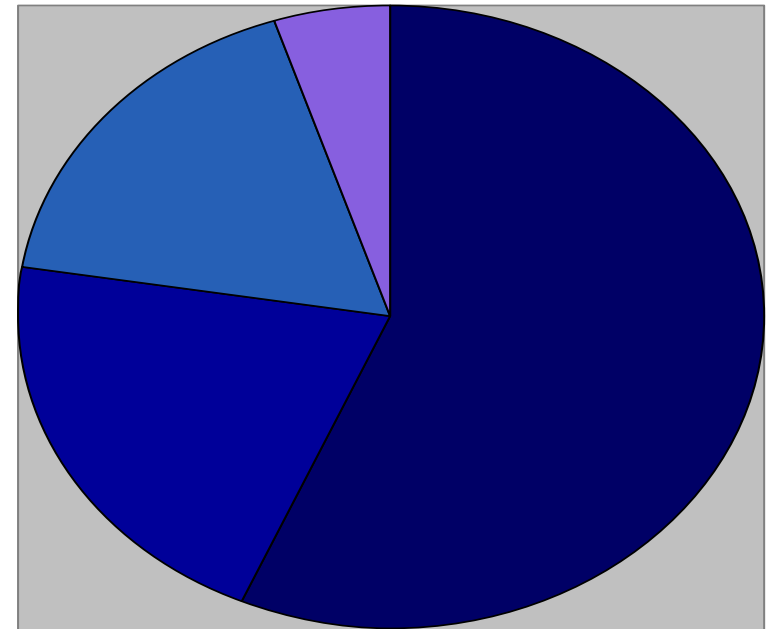


Contrasting Causes of Chest Pain

General Practice



Hospital





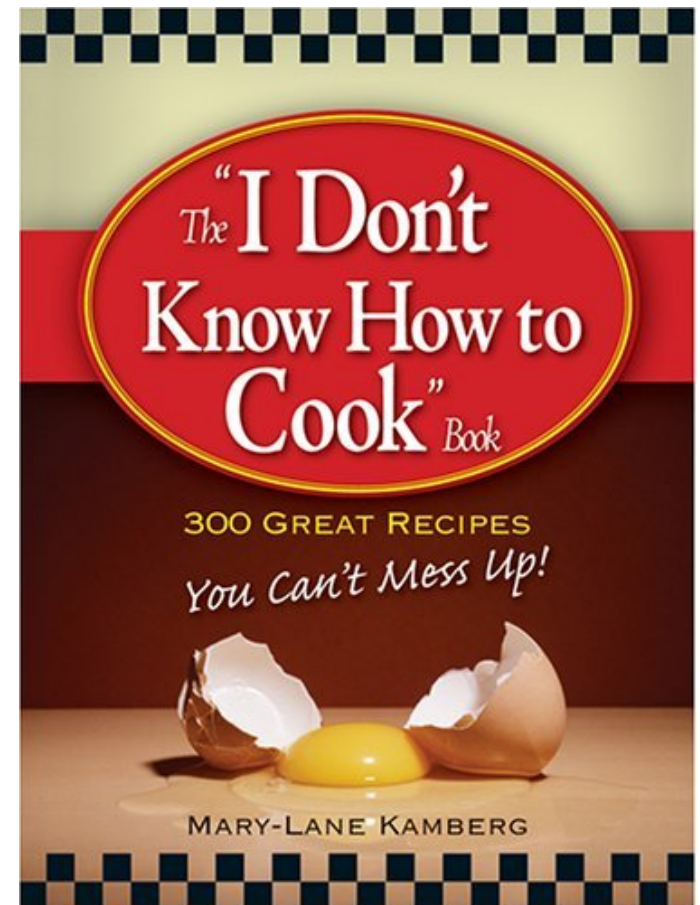
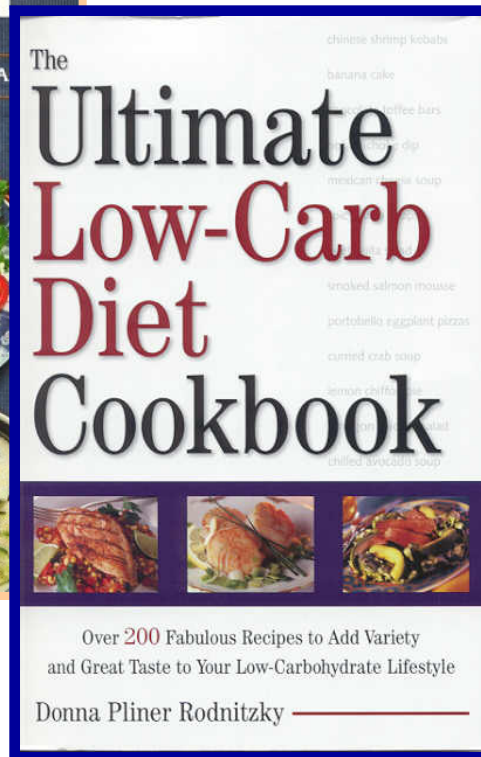
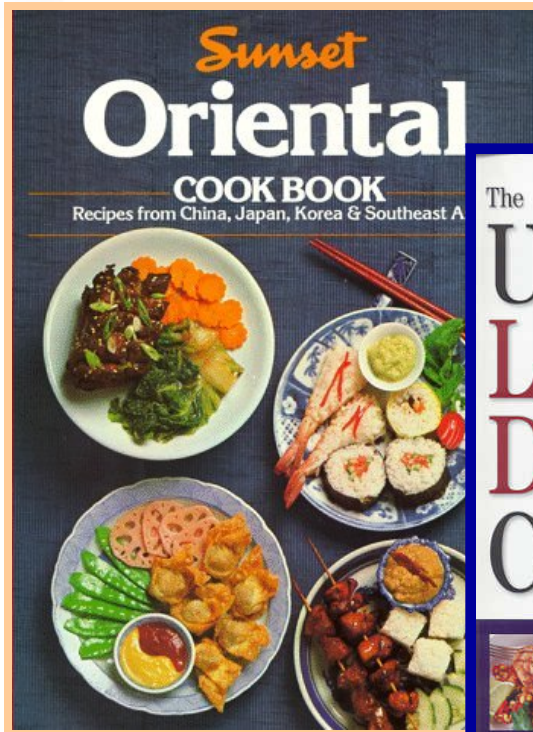
Why?

- Pattern of illness: Community vs hospital
- Undifferentiated & unorganized illness
- No prior assumptions
- Information on which to base a *precise diagnosis* is lacking- *early presentation*
- Direct availability of physicians & unpredictable workload
- Doctor-patient relationship-

Use of time

Problem-Solving Styles

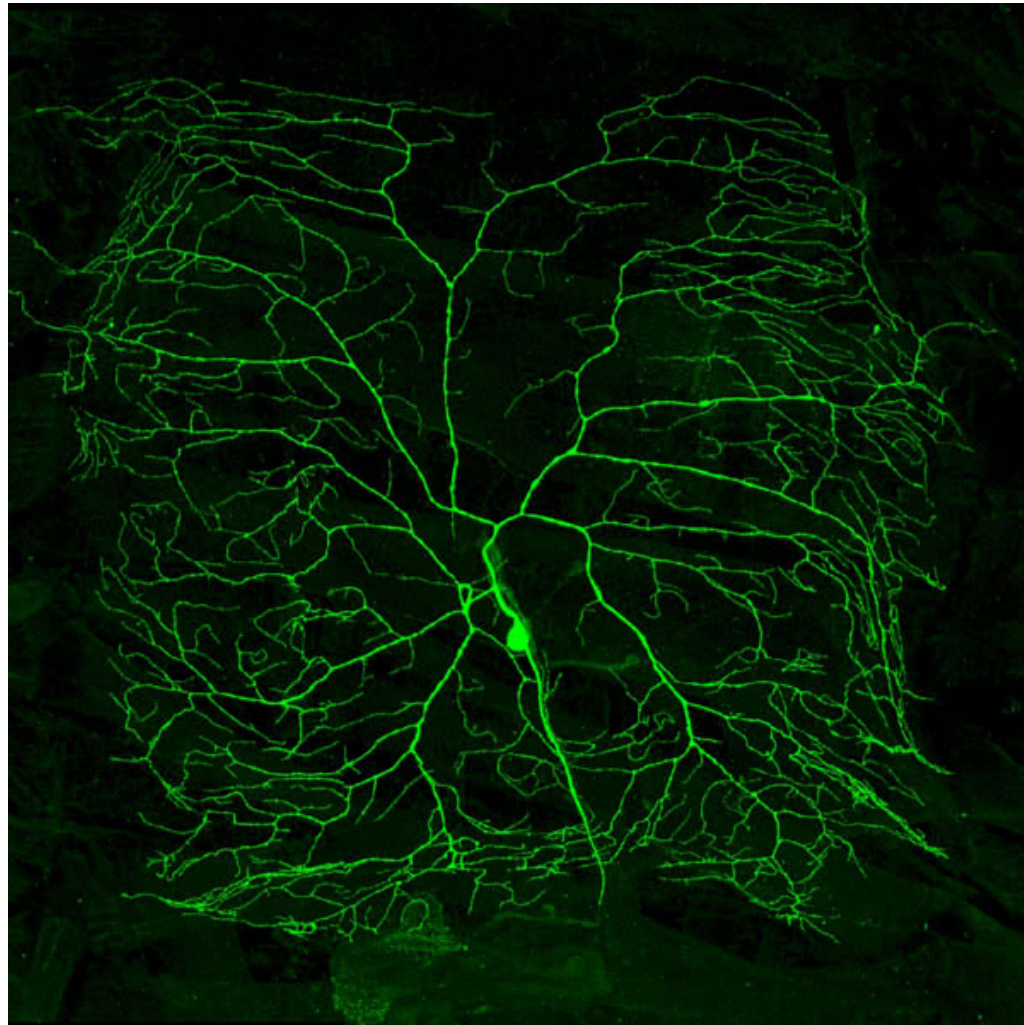
Cookbook

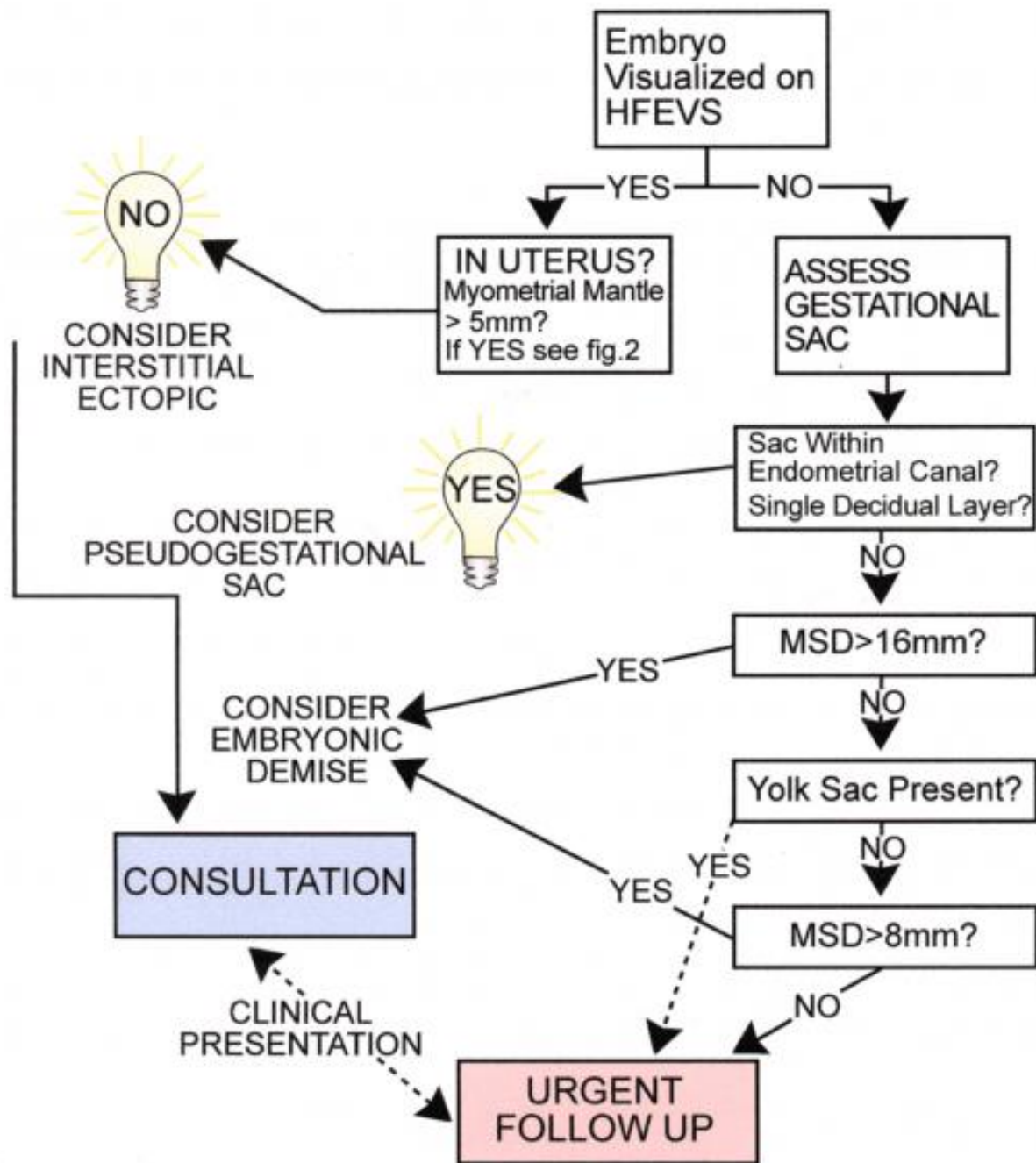


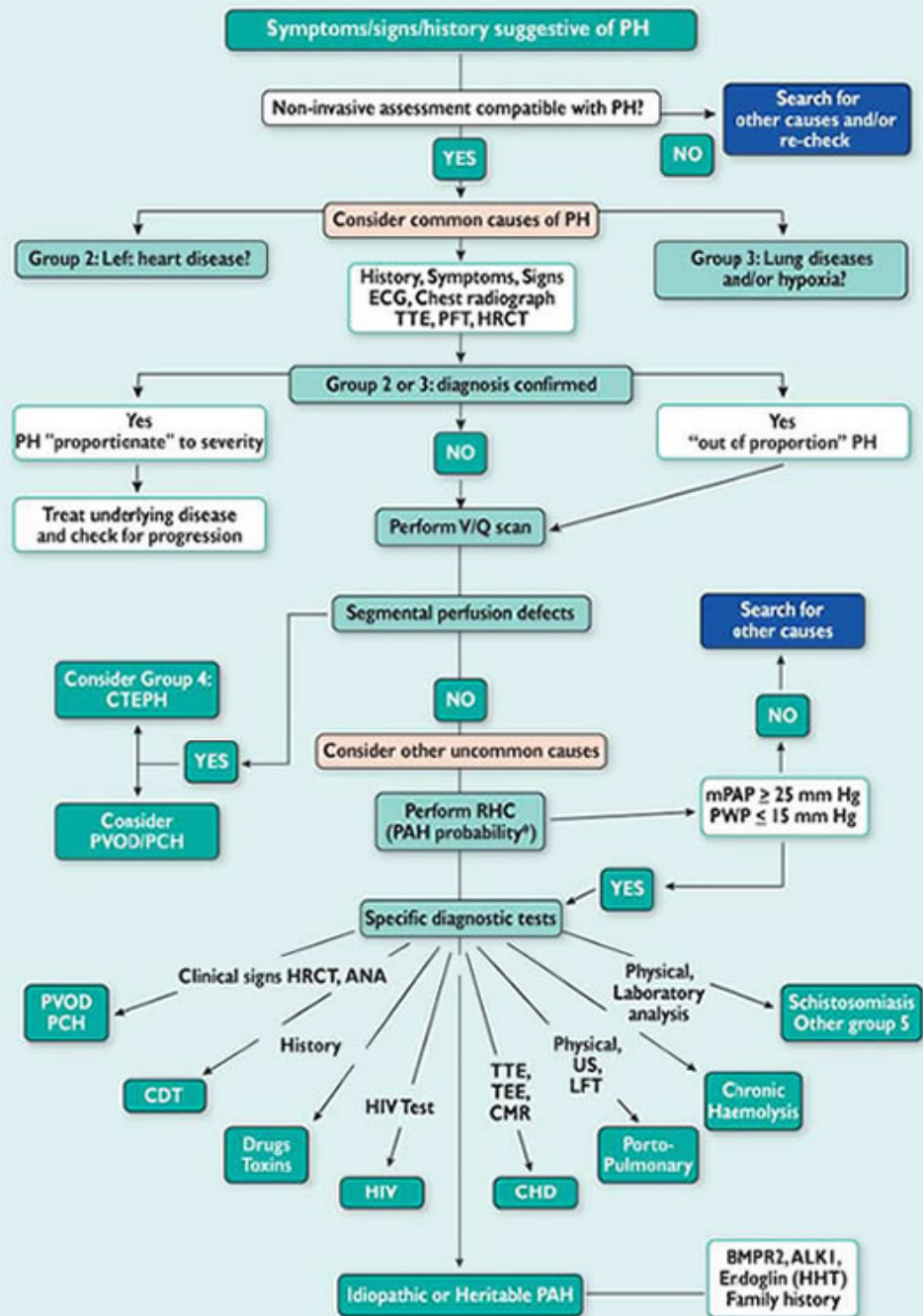
Arborization



Dendritic Arborization







Designation of levels of evidence according to type of research question

	Level	Intervention ¹	Diagnosis ²	Prognosis ¹	Aetiology ^{1,3}
Least biased	I	Systematic review of level II studies	Systematic review of level II studies	Systematic review of level II studies	Systematic review of level II studies
	II	Randomised controlled trial	Cross-sectional study among consecutive presenting patients	Inception cohort study	Prospective cohort study
	III	One of the following: <ul style="list-style-type: none"> • non-randomised experimental study (eg controlled pre- and post-test intervention study) • comparative (observational) study with a concurrent control group (eg cohort study, case-control study) 	One of the following: <ul style="list-style-type: none"> • cross-sectional study among non-consecutive patients • diagnostic case-control study 	One of the following: <ul style="list-style-type: none"> • untreated control patients in a randomised controlled trial • retrospectively assembled cohort study 	One of the following: <ul style="list-style-type: none"> • retrospective cohort study • case-control study <p>(Note: these are the most common study types for aetiology, but see level III for intervention studies for other options)</p>
Most biased	IV	Case series	Case series	Case series, or a cohort study of patients at different stages of disease	A cross-sectional study



Problem-Solving Styles



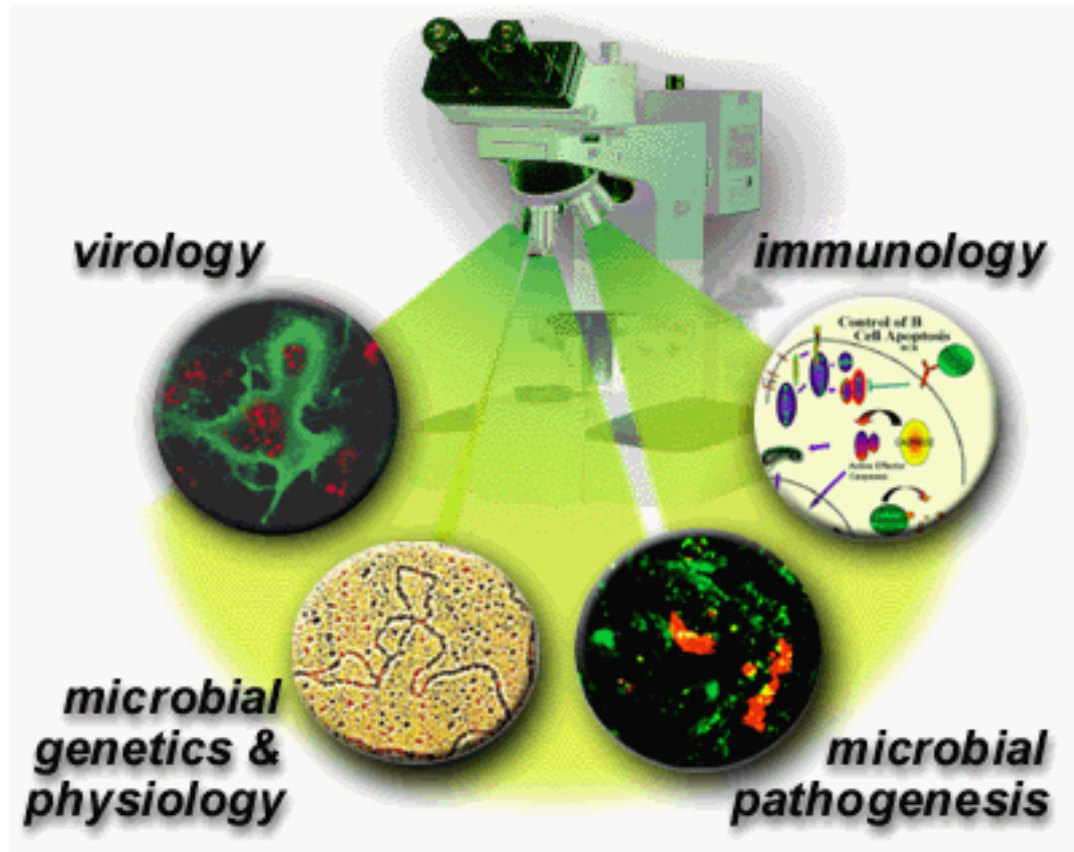
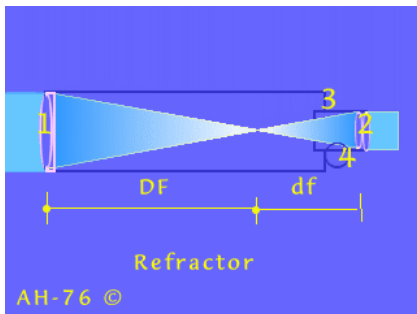
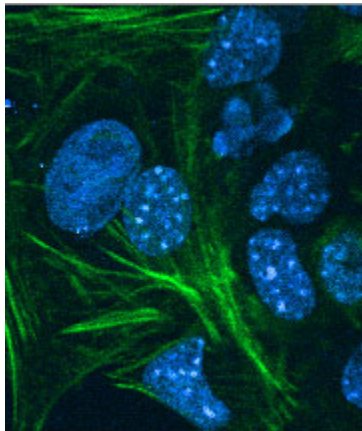
EUREKA





Problem-Solving Styles

Biomedical Scientist



Problem-Solving Styles

Basket





Inductive Method of Problem-Solving

Full history:

Presenting complaint/ Systemic enquiry

Previous medical history/ Drugs/ Social/ family

PLUS

Complete physical Examination

PLUS

Investigations



Diagnosis



Hypothesis Matrix

“Chest Pain”

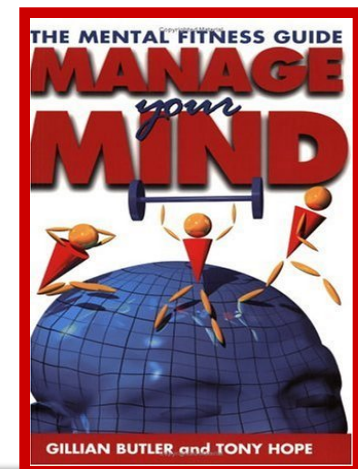
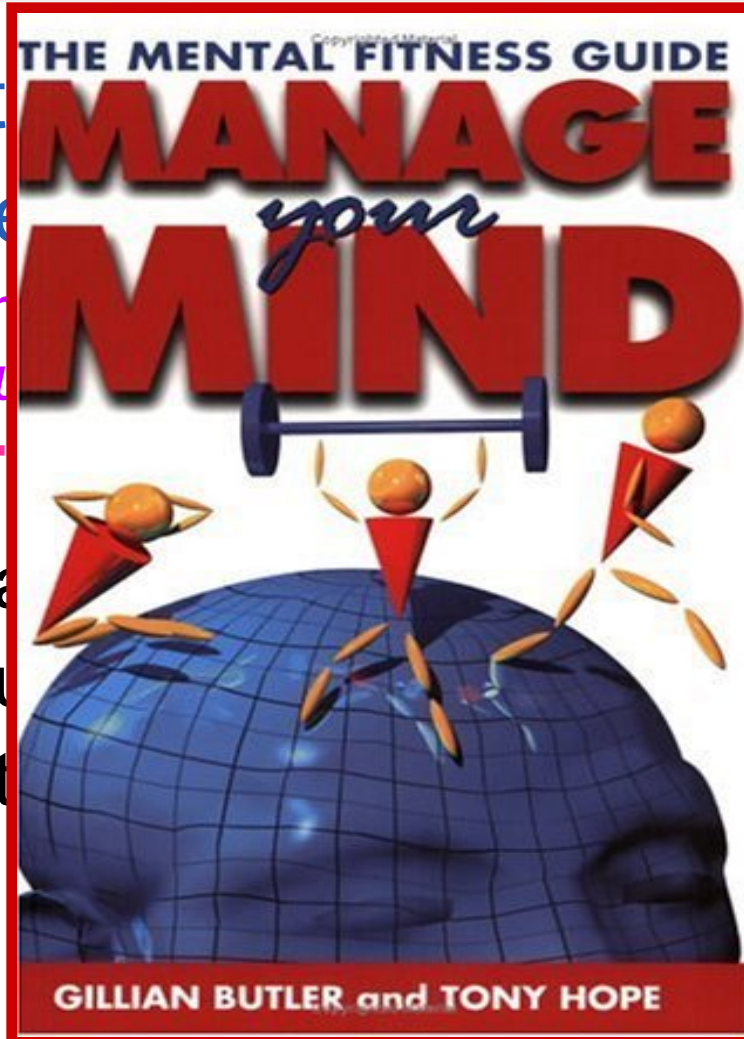
Pathophysiologic process	Organ System		
	<i>Cardio-vascular</i>	<i>Pulmonary</i>	<i>Gastro-intestinal</i>
Mechanical	MI Dissecting aneurysm	Embolism	Achalasia
Inflammatory	Pericarditis	Pleuritis	Ulcer
Infectious	Endocarditis Myocarditis	Pneumonia	GE



3 Stages of Problem Solving

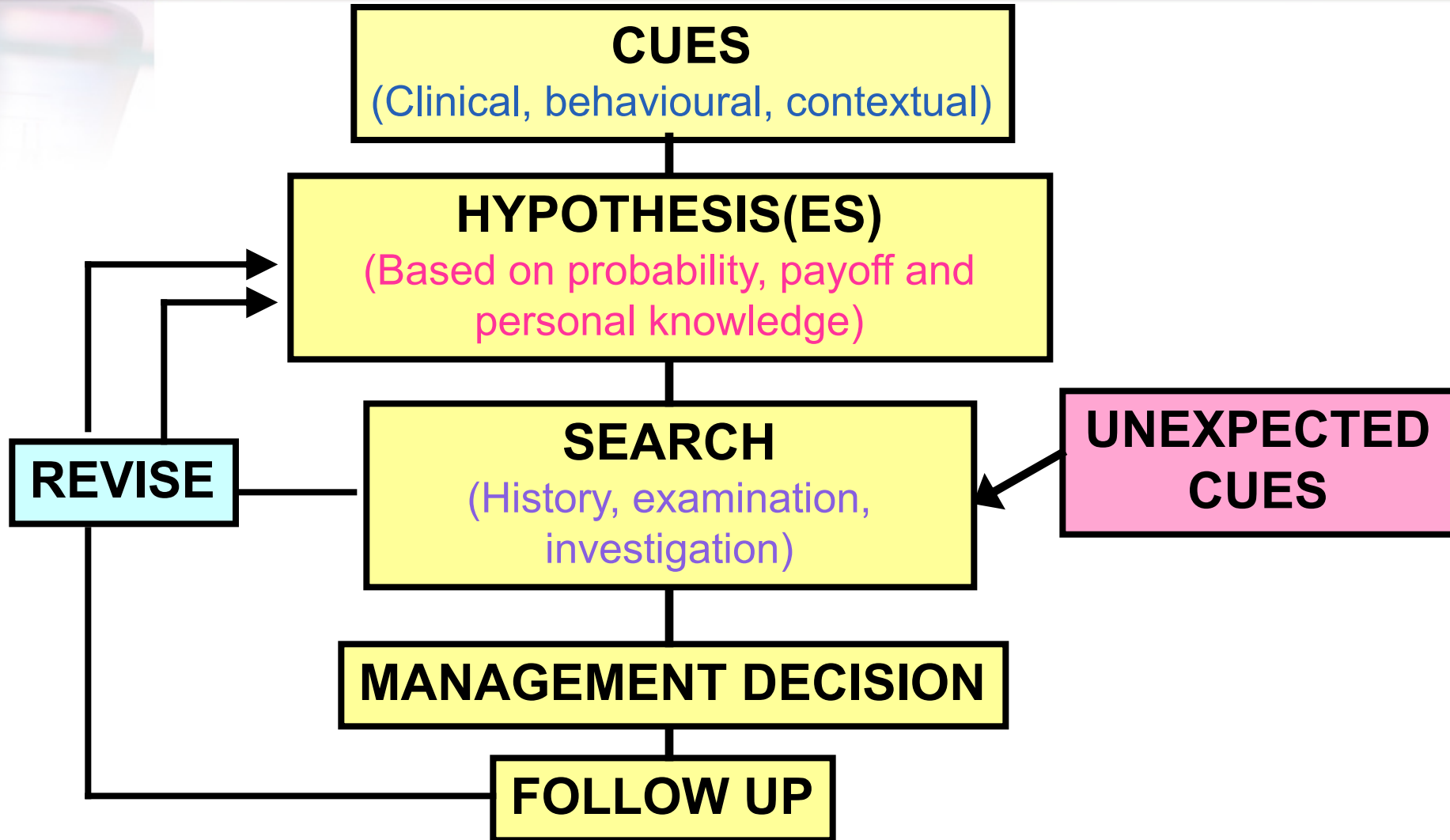
1. Identify the problem
2. Generate solutions
- do not reject any ideas, no matter how preposterous
3. Take **ST**eps
 - a) **S**elect a solution
 - b) **T**ry it out
 - c) **E**valuate the results
 - d) **P**ersist with the chosen solution

as possible:
even if the solution is preposterous
the problem:





Hypothetico-Deductive Model





Case 1



A 61-year-old widow presents with a history of ‘wetting herself’ for the previous 5 days because she ‘can’t get to the toilet on time’. She had felt ‘perfectly well’ prior to the onset of her present symptomatology. Her medical records reveal she has no history of significant illness and that she is an infrequent attender.



Diagnostic Strategies in Clinical Practice

- Pattern recognition **20%***
- Arborization (multiple branching)
- Inductive: Exhaustive exploration of data.
- Hypthetico-deductive
- Computer-assisted

* Heneghan C, et al: Diagnostic Strategies Used in Primary Care. *BMJ* 2009; 338:1003-6



Case 2:

A 32-year-old divorcee with 2 children who has been 'well' until 2 months previously. She presented with:

Presentation 3

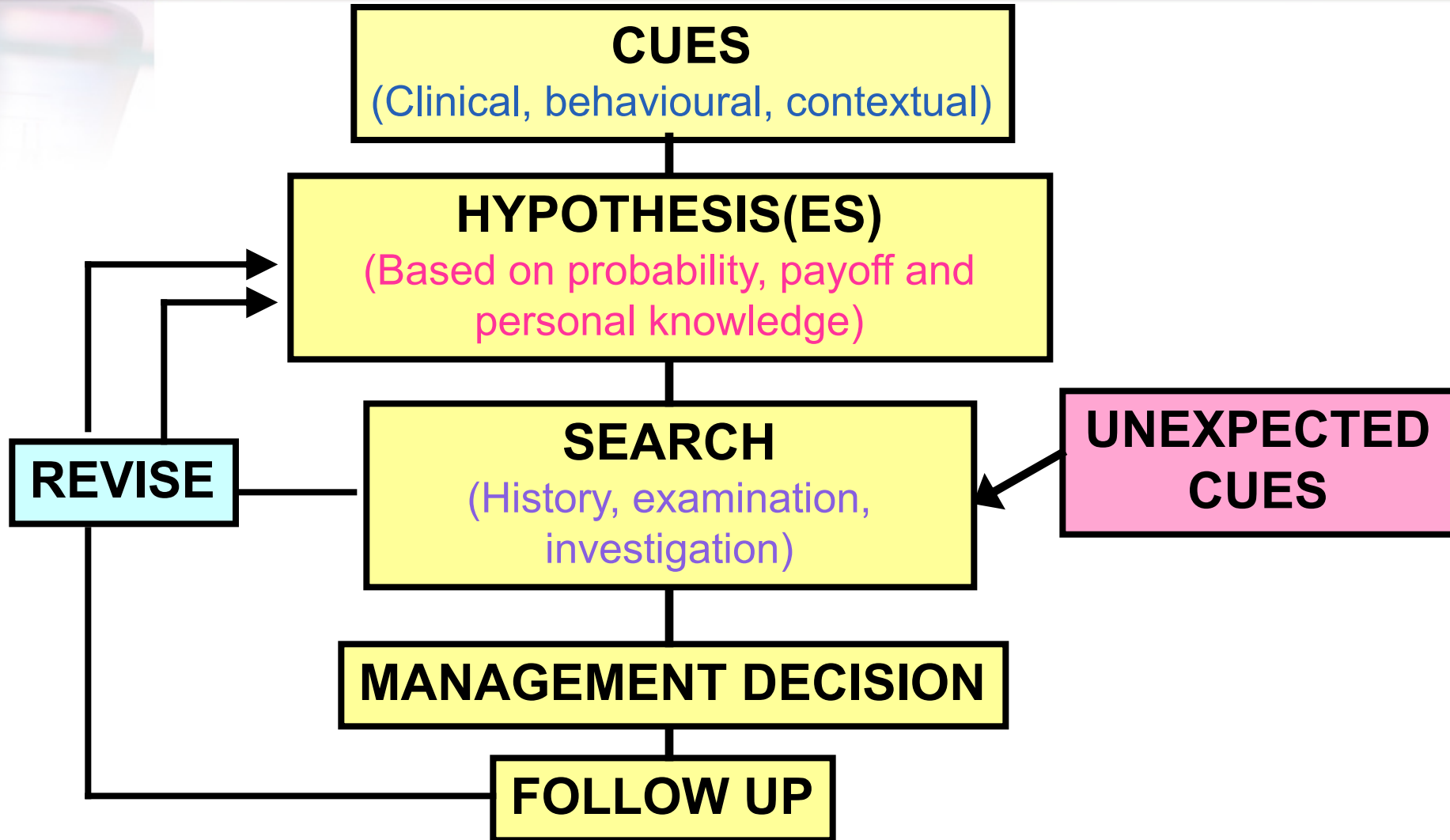
Tiredness

? Weight loss

Normal appetite



Identification of Errors





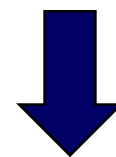
Why order a test?

- To rule in or out a diagnosis
- To screen for disease among asymptomatic patients
- To provide prognostic information on patients with established disease
- To monitor ongoing therapy, maximize effectiveness, and minimize side effects.
- To reassure a patient

The diagnostic process is probabilistic



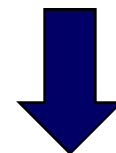
Prior probability



Post-history probability



Post-exam probability



Post-test probability
(posterior probability)



When Order a *diagnostic* Test?

- When the characteristics of that test give it *validity* in the clinical setting.
- When the test result will **change the probability** of the disease leading to a change in clinical strategy.





Hypothetico-Deductive Model

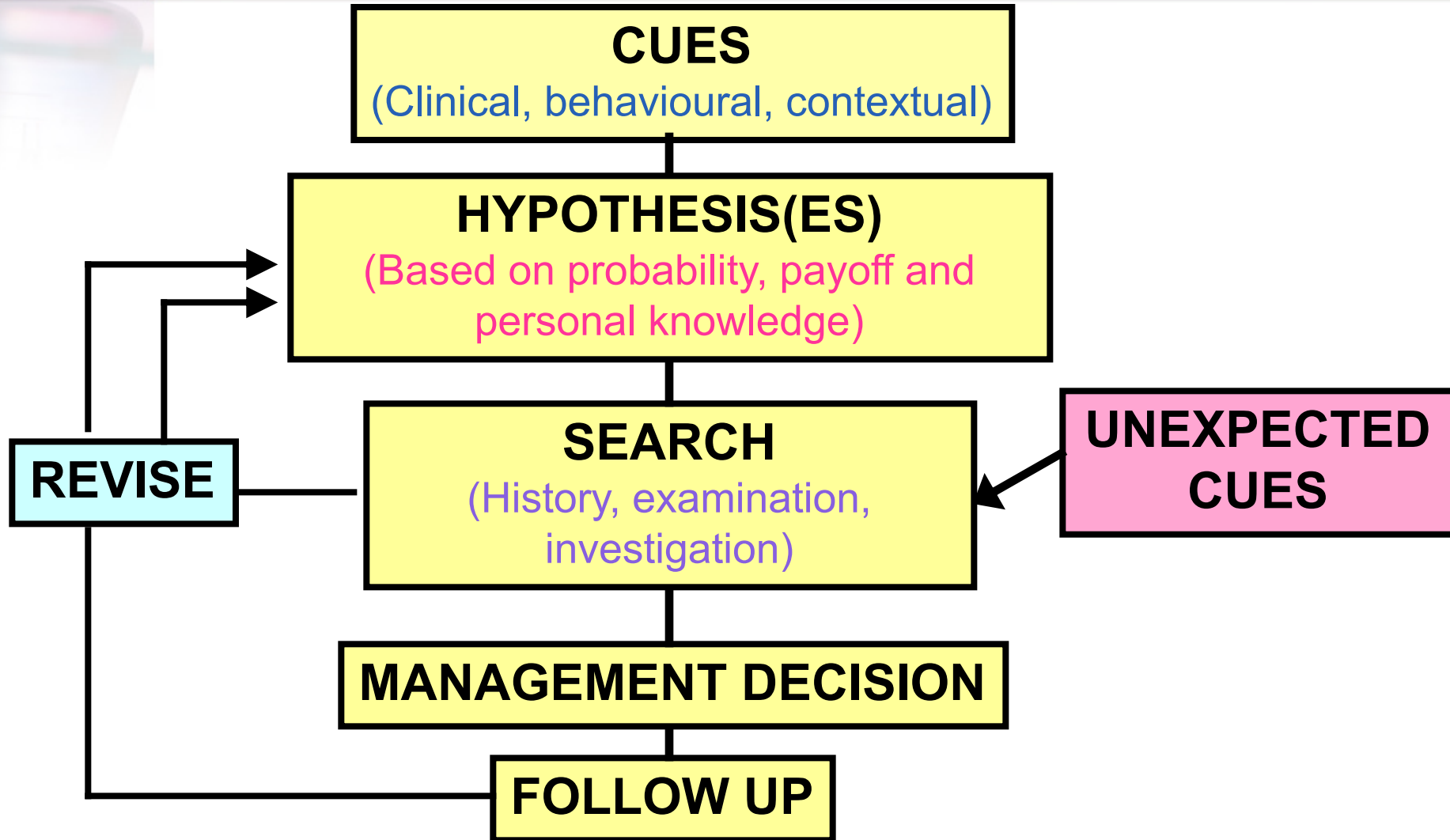




Table 3.3 Results of a systematic review of serum ferritin as a diagnostic test for iron deficiency anemia

		Target disorder (iron deficiency anemia)		Totals
		Present	Absent	
Diagnostic test result (serum ferritin)	Positive (<65 mmol/L)	731 a	270 b	1001 a+b
	Negative (≥65 mmol/L)	78 c	1500 d	1578 c+d
Totals		a+c 809	b+d 1770	a+b+c+d 2579

Data from: Guyatt GH, Oxman AD, Ali M, et al. *J Gen Intern Med* 1992; 7: 145–53.

Prevalence = $(a + c)/(a + b + c + d) = 809/2579 = 31\%$.

Positive predictive value = $a/(a + b) = 731/1001 = 73\%$.

Negative predictive value = $d/(c + d) = 1500/1578 = 95\%$.

Sensitivity = $a/(a + c) = 731/809 = 90\%$.

Specificity = $d/(b + d) = 1500/1770 = 85\%$.

LR+ = $\text{sensitivity}/(1 - \text{specificity}) = 90\%/15\% = 6$.

LR- = $(1 - \text{sensitivity})/\text{specificity} = 10\%/85\% = 0.12$.

Study pre-test odds = $\text{prevalence}/(1 - \text{prevalence}) = 31\%/69\% = 0.45$.

Post-test odds = $\text{pre-test odds} \times \text{likelihood ratio}$.

Post-test probability = $\text{post-test odds}/(\text{post-test odds} + 1)$.



The 2 x 2 Table

Table 3.3 Results of a systematic review of serum ferritin as a diagnostic test for iron deficiency anemia

		Target disorder (iron deficiency anemia)		Totals
		Present	Absent	
Diagnostic test result (serum ferritin)	Positive (<65 mmol/L)	731 a	270 b	1001 a+b
	Negative (≥65 mmol/L)	78 c	1500 d	1578 c+d
Totals		a+c 809	b+d 1770	a+b+c+d 2579

Data from: Guyatt GH, Oxman AD, Ali M, et al. J Gen Intern Med 1992; 7: 145–53.



SpPin and SnNout

Table 3.3 Results of a systematic review of serum ferritin as a diagnostic test for iron deficiency anemia

		Target disorder (iron deficiency anemia)		Totals
		Present	Absent	
Diagnostic test result (serum ferritin)	Positive (<65 mmol/L)	731 a	270 b	1001 a+b
	Negative (≥65 mmol/L)	78 c	1500 d	1578 c+d
Totals		a+c 809	b+d 1770	a+b+c+d 2579

Data from: Guyatt GH, Oxman AD, Ali M, et al. J Gen Intern Med 1992; 7: 145–53.



SpIn and SnOut

Table 3.3 Results of a systematic review of serum ferritin as a diagnostic test for iron deficiency anemia

		Target disorder (iron deficiency anemia)		Totals
		Present	Absent	
Diagnostic test result (serum ferritin)	Positive (<65 mmol/L)	731 a	270 b	1001 a+b
	Negative (≥65 mmol/L)	<input type="text"/> c	1500 d	c+d 1578
Totals		a+c 809	b+d 1770	a+b+c+d 2579

- SnOut: A highly sensitive test, if negative, helps to rule the disease out.



SnOut

Data from: Guyatt GH, Oxman AD, Ali M, et al. J Gen Intern Med 1992; 7: 145-53.



Sp*P*in and *S*nNout

Table 3.3 Results of a systematic review of serum ferritin as a diagnostic test for iron deficiency anemia

		Target disorder (iron deficiency anemia)		Totals
		Present	Absent	
Diagnostic test result (serum ferritin)	Positive (<65 mmol/L)	731 a	<input type="text"/> b	1001 a+b
	Negative (≥65 mmol/L)	78 c	1500 d	1578 c+d
Totals		a+c 809	b+d 1770	a+b+c+d 2579


- Sp*P*in: A highly specific test, if positive, helps to rule the disease in.

↓
Sp*P*in

Data from: Guyatt GH, Oxman AD, Ali M, et al. J Gen Intern Med 1992; 7: 145–53.



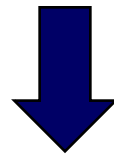
What do diagnostic tests do?



Patient presentation (e.g. with symptoms)

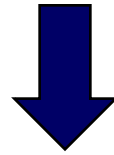
LRs from history

(prior probability)



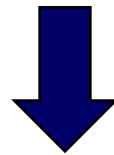
Post-history probability

LRs from examination



Post-examination probability

LRs from testing



Post-test probability

(posterior probability)

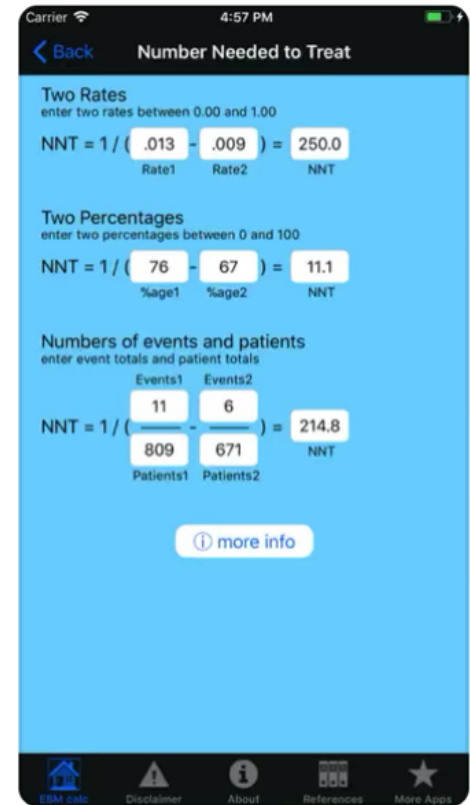
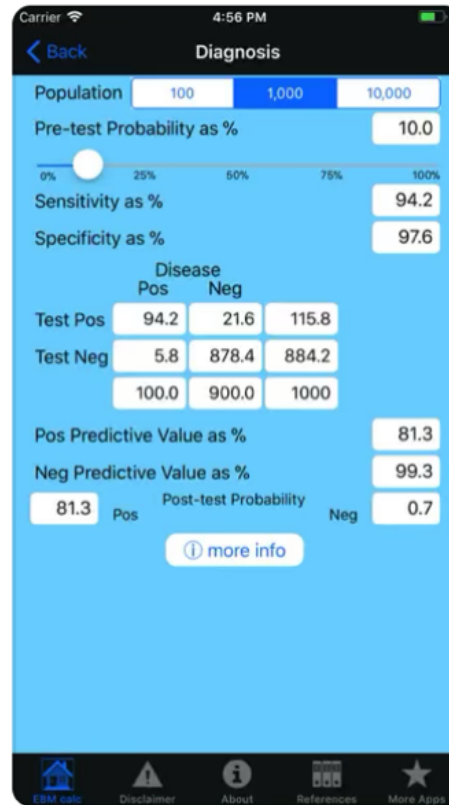
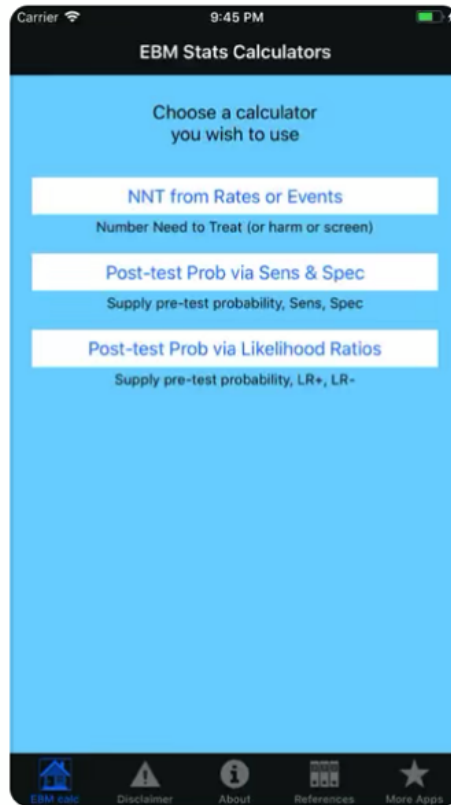


EBM Stats Calc

calculate basic EBM stats

OPEN

★★★★☆ 1

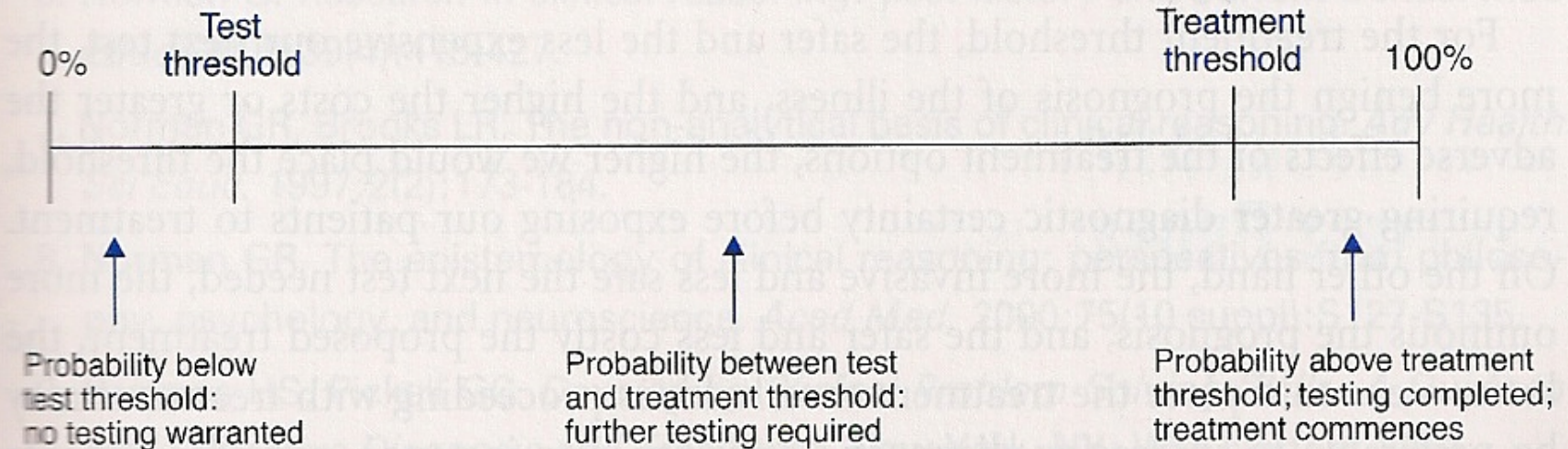




Test and Treatment Thresholds

Test and Treatment Thresholds in the Diagnostic Process

Probability of Diagnosis





Chest Pain and Ischemic Heart Disease (IHD)

- Test Threshold?
- Treatment threshold?



Chest Pain and ECG

- How helpful is the **stress ECG** in diagnosing **IHD** among patients presenting with **acute chest pain**?
- **Sensitivity: 60%**
- **Specificity: 91%**
- **Likelihood ratio:**
 - **+ve: 6.7**
 - **-ve: 0.4**



Chest Pain and stress ECG-

Scenario 1

- Middle aged man
- Typical history of angina
- Tight substernal pain

■ ↑ by exercise

■ ↓ by rest- within 5 min

Stress ECG?

Post-test probability of IHD:

+ve = **98%**

-ve = **70%**

Probability of IHD: 90%



Chest Pain and stress ECG-

Scenario 2

- 40-year-old
- Vague (L) Sided chest pain
- Unrelated to exercise
- ↑ by moving the chest wall

Stress ECG?

Post-test probability of IHD:

+ve = **28%**

-ve = **<2%**

Probability of IHD: 5%



Chest Pain and stress ECG-

Scenario 3

- Middle aged man
- Attacks substernal pain several months
- Occurs at rest few min —
1/2 hr
- Worsened since onset
- ↑ By exertion
- X relieved by rest

Stress ECG?

Post-test probability of IHD:

+ve = **87%**

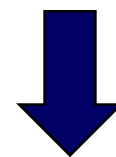
-ve = **25%**

Probability of IHD: 50%

The diagnostic process is probabilistic



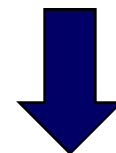
Prior probability



Post-history probability




Post-exam probability



Post-test probability
(posterior probability)



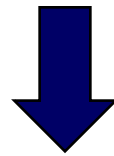
What do diagnostic tests do?



Patient presentation (e.g. with symptoms)

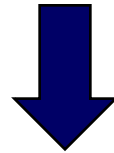
LRs from history

(prior probability)



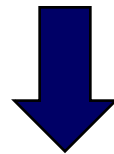
Post-history probability

LRs from examination



Post-examination probability

LRs from testing



Post-test probability

(posterior probability)



Likelihood Ratios

- We take our initial assessment of the likelihood of disease (“pre-test probability”), do a test to help us shift our suspicion one way or the other, and then determine a final assessment of the likelihood of disease (“post-test probability”).
- Likelihood ratios (LRs) tell us how much we should shift our suspicion for a particular test result.
- The “positive likelihood ratio” (LR+) tells us how much to increase the probability of disease if the test is positive, while the “negative likelihood ratio” (LR-) tells us how much to decrease it if the test is negative.



Likelihood Ratios

LR+ =

Probability of an individual ***with the condition*** having a ***positive test***

Probability of an individual ***without the condition*** having a ***positive test***

LR- =

Probability of an individual ***with the condition*** having a ***negative test***

Probability of an individual ***without the condition*** having a ***negative test***



Likelihood Ratios

Table 3.3 Results of a systematic review of serum ferritin as a diagnostic test for iron deficiency anemia

		Target disorder (iron deficiency anemia)		Totals
		Present	Absent	
Diagnostic test result (serum ferritin)	Positive (<65 mmol/L)	731 a	270 b	1001 a+b
	Negative (≥65 mmol/L)	78 c	1500 d	1578 c+d
Totals		a+c 809	b+d 1770	a+b+c+d 2579

Data from: Guyatt GH, Oxman AD, Ali M, et al. J Gen Intern Med 1992; 7: 145-53.

$$LR+ = \frac{\text{Sensitivity}}{1 - \text{specificity}}$$

$$LR- = \frac{1 - \text{sensitivity}}{\text{Specificity}}$$



Chest Pain and ECG

- How helpful is the **stress ECG** in diagnosing **MI** among patients presenting with **acute chest pain**?
- **Sensitivity: 60%**
- **Specificity: 91%**
- **Likelihood ratio:**
 - **+ve: 6.7**
 - **-ve: 0.4**



Chest Pain and ECG- *Scenario 1*

- Middle aged man
- Typical history of angina
- Tight substernal pain

■ ↑ by exercise

■ ↓ by rest- within 5 min

Stress ECG?

Post-test probability of IHD:

+ve = **98%**

-ve = **70%**

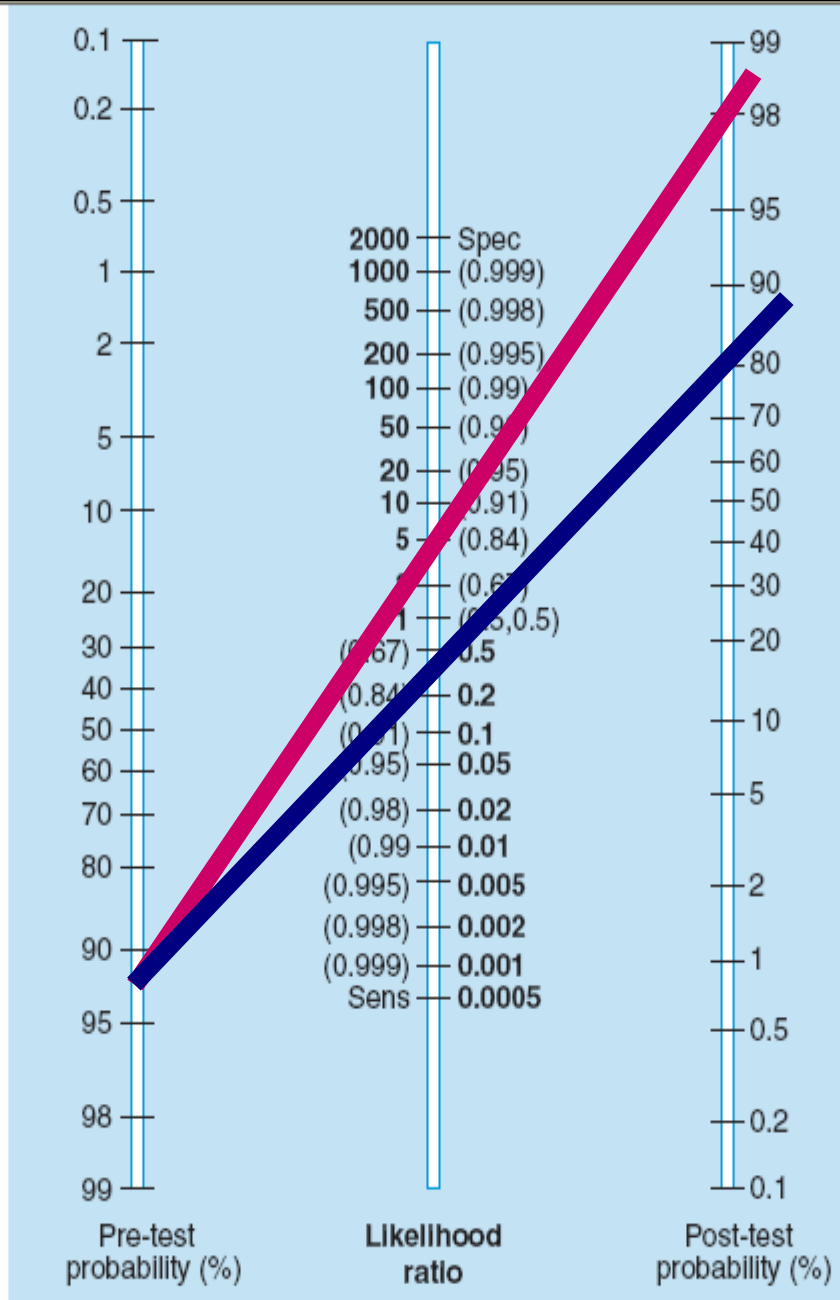
Probability of IHD: 90%



Scenario 1

+ve

-ve





Chest Pain and ECG- *Scenario 2*

- 40-year-old
- Vague (L) Sided chest pain
- Unrelated to exercise
- ↑ by moving the chest wall

Stress ECG?

Post-test probability of IHD:

+ve = **28%**

-ve = **<2%**

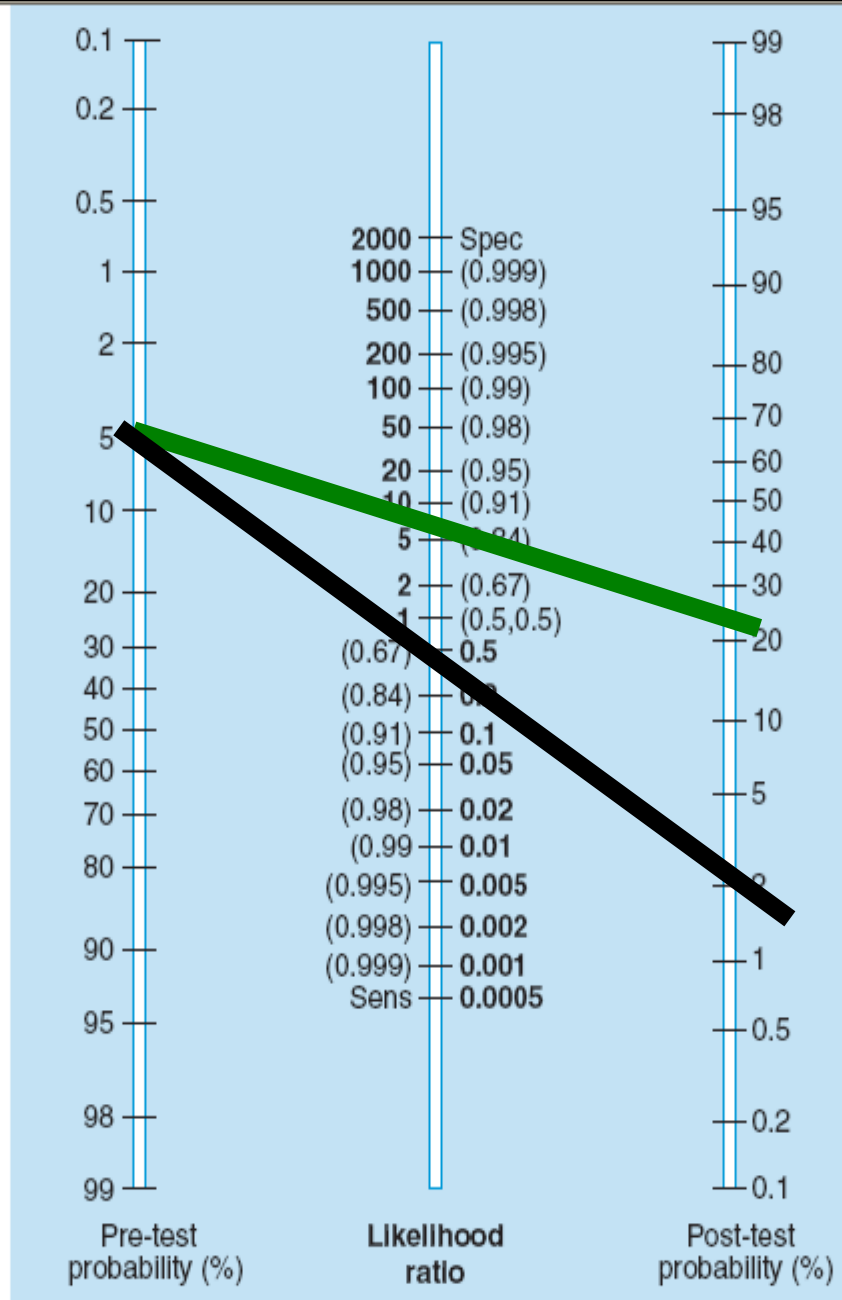
Probability of IHD: 5%



Scenario 2

+ve

-ve





LR Interpretation

>10	Large & often conclusive increase in the likelihood of disease
5-10	Moderate increase in the likelihood of disease
2-5	Small increase in the likelihood of disease
1-2	Minimal increase in the likelihood of disease
1	No change in the likelihood of disease
0.5-1.0	Minimal decrease in the likelihood of disease
0.2-0.5	Small decrease in the likelihood of disease
0.1-0.2	Moderate decrease in the likelihood of disease
<0.1	Large & often conclusive decrease in likelihood of disease



Strength of a Diagnostic Test

Strength of Test by Likelihood Ratio

Qualitative Strength	LR+	LR-
Excellent	10	0.1
Very Good	5	0.2
Fair	2	0.5
Useless	1	1



Estimating Pre-Test Probability

- Research papers evaluating diagnostic tests
- Epidemiological studies and national surveys
- Audit data
- Clinical experience



Clinical Symptoms & Diagnosis of UTI

1. Patient population.
2. Intervention.
3. Comparison intervention.
4. Outcomes.

Women in child bearing age

Symptoms

Probability of UTI

“In women in child bearing age suspected to have UTI, to what extent, would the presence or absence of certain symptoms relate to the probability of UTI?”



Clinical Signs and Symptoms in the Prediction of Urinary Tract Infection

Symptom	LR+	LR-	Symptom	LR+	LR-
Dysuria	1.5	0.48	Vaginal Irritation	0.24	2.7
Frequency	1.8	0.59	Back Pain	1.6	0.83
Hematuria	2.0	0.92	Self-diagnosis	4.0	0
Fever	1.6	0.9	Vaginal Discharge on Physical Examination	0.69	1.1
Flank Pain	1.1	0.84	Costovertebral Angle Tenderness on PE	1.7	0.86
Lower Abdominal Pain	1.1	0.89	Dipstick Urinalysis	4.2	0.3
Vaginal Discharge	0.34	3.1			



Clinical Signs and Symptoms in the Prediction of Urinary Tract Infection

Symptom Combination	LR+	Symptom Combination	LR-
Dysuria present	1.5		
Frequency present	1.8		
Vaginal discharge absent	3.1		
Vaginal irritation absent	2.7		

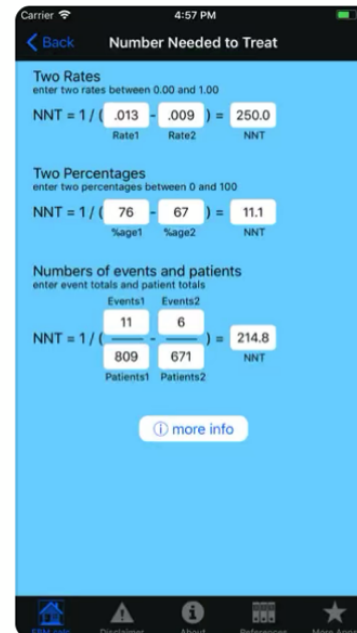
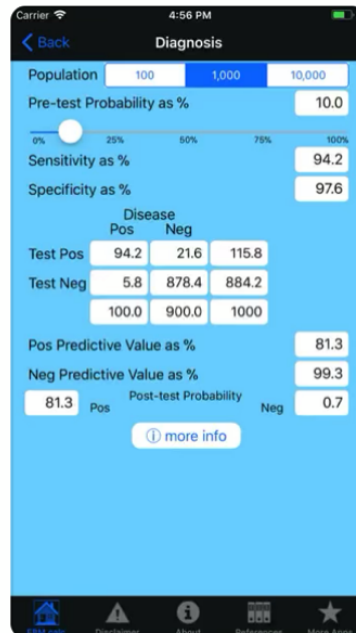


EBM Stats Calc

calculate basic EBM stats

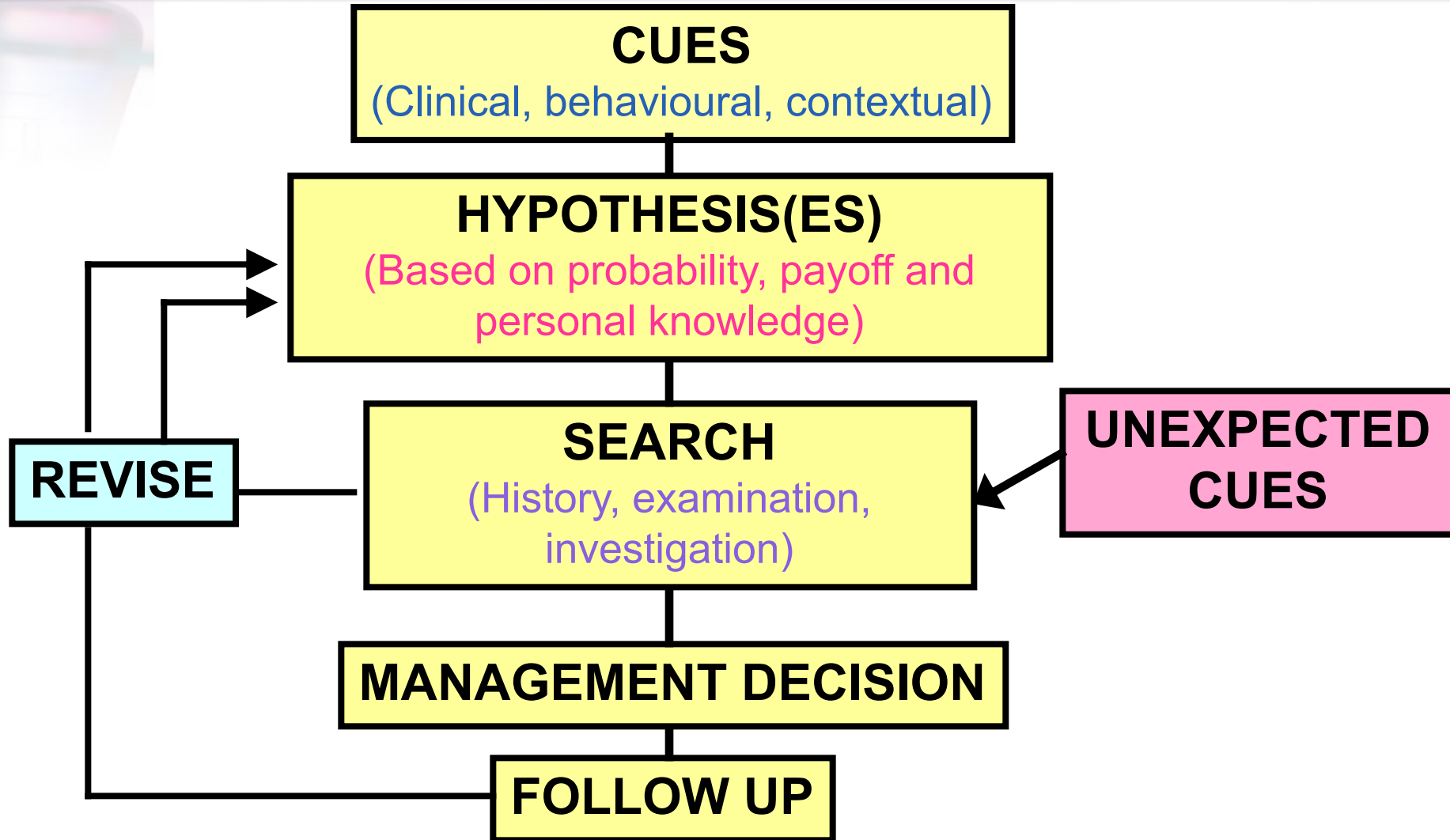
[OPEN](#)

★★★★☆ 1





Hypothetico-Deductive Model



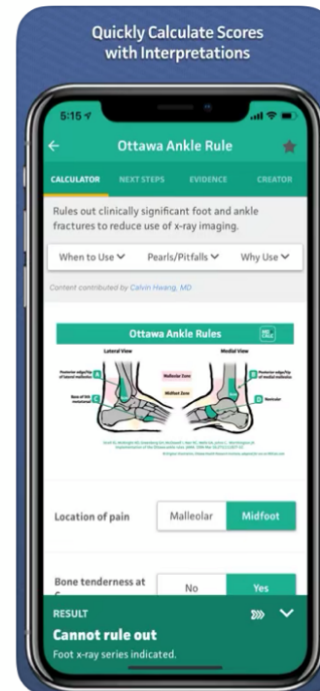
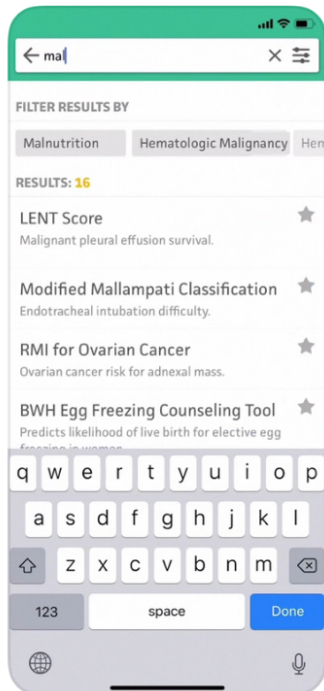


MDCalc Medical Cal...

Clinical Decision Support

OPEN

★★★★★ 33K





8:48

App Store

Search "Creatinine" or "Cock..."

FAVORITES RECENT MY SPECIALTY ALL

Family Practice

- 4AT
Delirium screening.
- 6 Minute Walk Distance
Functional status.
- AAP Pediatric HTN Guidelines
Pediatric HTN diagnosis.
- Absolute Lymphocyte Count
ALC count, and predicted CD4 Count.
- Absolute Neutrophil Count
Neutropenia (after chemotherapy).
- ABCD² Score
Stroke risk after TIA: inpt vs outpt.
- Acute Gout Diagnosis Rule
Risk for gout.
- ACEF II Risk Score
Cardiac surgery mortality.
- ACR/EULAR Gout Criteria
Gout diagnostic criteria.
- ACTION ICU Score

App Store

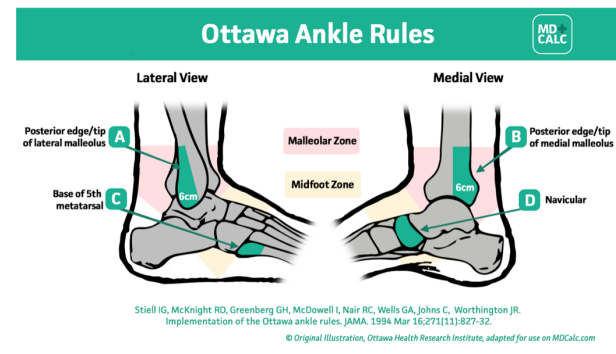
Ottawa Ankle Rule

CALCULATOR NEXT STEPS EVIDENCE CREATOR

Rules out clinically significant foot and ankle fractures to reduce use of x-ray imaging.

When to Use ▼ Pearls/Pitfalls ▼ Why Use ▼

Content contributed by Calvin Hwang, MD



Location of pain

Malleolar Midfoot

Inability to bear weight both immediately after injury AND in ED

No Yes

Patient unable to take four steps



All databases

SEARCH

[Search Tips](#)

Browse Our Databases and Interactive Tools [Help me choose](#)

- [Essential Evidence Topics](#)
- [Decision Support Tools](#)
- [POEMs](#)
- [History and Physical Exam Calculators](#)
- [Cochrane Systematic Reviews](#)
- [Diagnostic Test Calculators](#)
- [E/M Coding](#)
- [Derm Expert Image Viewer](#)

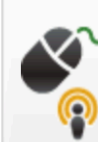
New to Essential Evidence Plus?

[Subscribe Now »](#)

[Get Free Trial »](#)

We are recruiting new authors to update EE+ topics; we need primary care and subspecialist experts in a range of subject areas.

If you are interested please send your CV to Hannah Lee (hlee@wiley.com) for consideration by our Editor-in-Chief, Dr Mark



Sign up to get POEMs the way you like them

- [POEM of the week Podcast](#)
- [Daily POEM Alerts](#)
- [Top 20 POEMs of 2018 from AAFP](#)



[Get EE+ on your smartphone](#)

New topics published: [Mediterranean spotted fever \(Boutonneuse fever\)](#); [Ovarian teratoma](#); [Paget disease of the breast](#); [Severe combined immunodeficiency](#)



Essential Evidence Plus is the only evidence-based, point-of-care clinical decision support system that gives you access to over 13,000 topics, guidelines, abstracts, and summaries

[Learn More »](#)

Make the most of your subscription to Essential Evidence Plus

Hear Dr Mark Ebell, Editor in Chief, explain key product features and how EE+ will enhance your practice

[Learn More »](#)



SEARCH ▶ InfoRetriever▼ DailyPOEMs▼

PRODUCT INFO

SUBSCRIPTIONS

SUPPORT

RESOURCES

SEARCH

ABOUT US

CONTACT US

NEWS

EVENTS NEAR YOU

InfoRetriever® Search

STEP 1: Enter a search term(s): [Help](#)

STEP 2:

Getting Started

Downloads

Register

InfoRetriever®

Search by Text

Search by Autofill

Search ICD9 Codes

Clinical Rules and
Calculators

Practice Guidelines

Internet Resources

Individual Databases

InfoPOEMs® Archive

My Account

Feedback

Log Out

InfoPOEMs is brought to you
by:



InfoRetriever® Search

[Help & Hints](#) | [Search Settings](#) | [Popular](#) | [InfoRetriever® Video](#) | [LOE Key](#)

STEP 1: Select type of search

Keyword-Assisted Search

STEP 2: Type in the medical term(s) to search for:

STEP 3:

Getting Started

Downloads

Register

InfoRetriever®

Search by Text

Search by Autofill

Search ICD9 Codes

Clinical Rules and
Calculators

Practice Guidelines

Internet Resources

Individual Databases

InfoPOEMs® Archive

My Account

Feedback

Log Out

InfoPOEMs is brought to you
by:



InfoRetriever® Search

[Help & Hints](#) | [Search Settings](#) | [Popular](#) | [InfoRetriever® Video](#) | [LOE Key](#)

Type of Search: **Keyword-Assisted Search**

Search Term(s): **uti**

[MODIFY SEARCH](#)

STEP 4: Select one or more of these keywords:

- UTI (lower)
- Asymptomatic bacteriuria in pregnancy
- Pyelonephritis

Select All

Clear All

STEP 5: Find items... [with any selected keyword](#)

InfoRetriever® Search Results




[Back to Search](#)

Collapse All




Expand All

[-] **Overviews and practice guidelines**

[-] **5 Minute Clinical Consult overviews**




-  [Hematuria \(LOE = 5\)](#)
-  [Urinary tract infection in females \(LOE = 5\)](#)
-  [Urinary tract infection in males \(LOE = 5\)](#)

[-] **Practice guidelines**



-  [Laser-assisted uvulopalatoplasty \(Am Acad Sleep Med\) \(LOE = 1a\)](#)
-  [Screening for asymptomatic bacteriuria \(USPSTF\) \(LOE = 1a\)](#)
-  [Use of antibiotics in children \(Singapore Ministry Health\) \(LOE = 1a\)](#)

[-] **Treatment**







[-] **General treatment**

-  [Treatments for symptomatic UTIs during pregnancy \(LOE = 1a or 2a\)](#)
-  [Replace cath before drug therapy of UTI \(LOE = 2b\)](#)
-  [Telephone management of UTI successful \(LOE = 4\)](#)

[-] **Cost effectiveness**

-  [Empiric therapy of UTIs is cost-effective \(LOE = 2c\)](#)
-  [Empiric treatment of UTIs is cost-effective \(LOE = 1b\)](#)

[-] **Drug Treatment**

-  [Antibiotic duration for treating uncomplicated, symptomatic lower UTIs in elderly women \(LOE = 1a or 2a\)](#)
-  [Duration of antibacterial treatment for uncomplicated urinary tract infection in women \(LOE = 1a or 2a\)](#)
-  [Long-term antibiotics for preventing recurrent UTI in children \(LOE = 1a or 2a\)](#)
-  [Short vs standard duration oral antibiotic therapy for acute UTI in children \(LOE = 1a or 2a\)](#)
-  [3 days cipro adequate for UTI in healthy older women \(LOE = 1b\)](#)
-  [3 days of cipro better for uncomplicated UTI \(LOE = 1b\)](#)

Downloads

Register

InfoRetriever®

[Repeat Last Search]

Search by Text

Search by Autofill

Search ICD9 Codes

Clinical Rules and
Calculators

Practice Guidelines

Internet Resources

Individual Databases

InfoPOEMs® Archive

My Account

Feedback

Log Out

InfoPOEMs is brought to you
by:



[-] **Diet, vitamins, exercise, PT, and OT**



[Cranberries for treating urinary tract infections \(LOE = 1a or 2a\)](#)



[Cranberry juice doesn't prevent catheter-associated UTI in children with neurogenic bladders \(LOE = 1b\)](#)

[-] **Diagnosis**

[-] **History and physical**



[Reliable symptoms/signs to dx UTI \(LOE = 2a\)](#)



[UTI suspected \(children\) ->UTI \(LOE = 1b\)](#)



[UTI suspected \(men\) ->UTI \(LOE = 1b\)](#)



[UTI suspected \(women 15 - 49\) ->UTI \(LOE = 1b\)](#)



[UTI suspected \(women > 50 yrs\) ->UTI \(LOE = 1b\)](#)



[UTI suspected \(women\) ->UTI \(LOE = 2a\)](#)

[-] **Diagnostic tests**



[Suspected UTI -> UTI \(LOE = 1b\)](#)



[UTI suspected \(adult\) -> UTI \(LOE = 1b\)](#)



[Clean-catching urine not necessary \(LOE = 4\)](#)



[Ultrasound/x-ray accurate in men with UTI \(LOE = 1b\)](#)

[-] **Clinical decision rules**



[Clinical variables predict UTI in febrile young girls under 2 \(LOE = 2b\)](#)



[UTI diagnosis \(LOE = 1a\)](#)



[UTI diagnosis \(Leibovici\) \(LOE = 1a\)](#)

[-] **Screening and Prevention**

[-] **Screening for disease**



[Don't screen/tx asymptomatic bacteriuria in DM women \(LOE = 1b\)](#)

[-] **Prevention (primary)**



[Cranberries for preventing urinary tract infections \(LOE = 1a or 2a\)](#)



[Methenamine hippurate for preventing urinary tract infections \(LOE = 1a or 2a\)](#)



[Antimicrobial prophylaxis for pediatric UTI only w/normal urinary tract \(LOE = 1a\)](#)

[-] **Epidemiology**

[-] **Risk factors for disease**



[Circumcision has a small protective effect against UTIs \(LOE = 2b\)](#)

[-] **Practice Administration/Health Systems**



[Telephone management of UTI successful \(LOE = 4\)](#)

[-] **Education**

 [Printer Friendly](#)



Symptom: UTI suspected, women 15 - 49 **Disease:** UTI

Select a Test:

Dysuria

Sort By:

Rule In (LR+)

Pretest probability:

50

Sensitivity:

80

Specificity:

50

Likelihood Ratios:

- Positive: 1.60
- Negative: 0.40

Probability of disease if test is:

- Positive: 61.54%
- Negative: 28.57%

Population Studied: Prospective study of 405 patients with suspected UTI, midstream urine obtained. Excluded if mixed growth or antibiotics.

Reference Standard: Urine culture > 100,000 cfu or > 100 WBC/HPF and 10-100k culture

LOE (1a - 5): 1b

- No. of Patients: 145
- Independent: Yes
- Blinded: Yes
- Gold Standard: Gold Standard: High Quality

Reference: Dobbs J Royal Coll Gen Pract 1987; 37: 100

» [Show test summary](#)

 [Printer Friendly](#)**Symptom:** UTI suspected, women 15 - 49 **Disease:** UTI**Select a Test:**Frequency **Sort By:**Rule In (LR+) **Pretest probability:**50 **Sensitivity:**87 **Specificity:**32 **Likelihood Ratios:**

- Positive: 1.28
- Negative: 0.41

Probability of disease if test is:

- Positive: 56.13%
- Negative: 28.89%

Population Studied: Prospective study of 405 patients with suspected UTI, midstream urine obtained. Excluded if mixed growth or antibiotics.**Reference Standard:** Urine culture > 100,000 cfu or > 100 WBC/HPF and 10-100k culture**LOE (1a - 5):** 1b

- No. of Patients: 145
- Independent: Yes
- Blinded: Yes
- Gold Standard: Gold Standard: High Quality

Reference: Dobbs J Royal Coll Gen Pract 1987; 37: 100[» Show test summary](#)



Symptom: UTI suspected, women 15 - 49

Disease: UTI

Select a Test:

Frequency ▾

- Hematuria
- Previous IVP
- Nocturia
- Dysuria
- Urgency
- Offensive urine
- Frequency
- Symptoms for <= 9 days
- Previous UTI
- Nausea

Sort By:

Rule In (LR+) ▾

Sensitivity:

87 ▾

Specificity:

32 ▾

Probability of disease if test is:

- Positive: 56.13%
- Negative: 28.89%

Population Studied: Prospective study of 405 patients with suspected UTI, midstream urine obtained. Excluded if mixed growth or antibiotics.

Reference Standard: Urine culture > 100,000 cfu or > 100 WBC/HPF and 10-100k culture

Study Quality (1a - 5):

- No. of Patients: 145
- Independent: Yes
- Blinded: Yes
- Gold Standard: Gold Standard: High Quality

Reference: Dobbs J Royal Coll Gen Pract 1987; 37: 100

» [Show test summary](#)

Getting Started

Downloads

Register

InfoRetriever®

Search by Text

Search by Autofill

Search ICD9 Codes

Clinical Rules and
Calculators

Practice Guidelines

Internet Resources













Individual Databases

InfoPOEMs® Archive

Feedback

Log Out

Clinical Rules and Calculators:

-  [CV: Acute MI/unstable angina](#)
-  [CV: Anqioplasty](#)
-  [CV: Chest pain and CAD](#)
-  [CV: DVT and PE](#)
-  [CV: Heart failure](#)
-  [CV: HTN, lipids, screening](#)
-  [CV: Pre-op evaluation](#)
-  [CV: Stroke](#)
-  [CV: Valve and endocarditis](#)
-  [Drug dosing](#)
-  [Endocrinology](#)
-  [Epidemiology](#)
-  [Fluids/electrolytes](#)
-  [Gastroenterology](#)
-  [Gynecology and obstetrics](#)
-  [Hematology/Oncology](#)
-  [Infectious disease](#)
-  [Musculoskeletal](#)
- [Neurology](#)
- [Overall mortality and screening](#)
- [Psychiatric and substance abuse](#)

 [Epidemiology](#)

 [Fluids/electrolytes](#)

 [Gastroenterology](#)

 [Gynecology and obstetrics](#)

 [Hematology/Oncology](#)

 [Infectious disease](#)

 [Musculoskeletal](#)

[Ankle injury: is x-ray needed \(Ottawa\)](#)

[Ankylosing spondylitis diagnosis](#)

[Back pain evaluation guideline](#)

[Blunt trauma: which patients need C-spine films?](#)

[Canadian C-spine rule in trauma patients](#)

[Carpal tunnel: success of medical tx](#)

[Fibromyalgia screening](#)

[Foot injury: is x-ray needed \(Ottawa\)](#)

[Hip fracture risk in women](#)

[Knee injury: is x-ray needed \(Ottawa\)](#)

[Minor head injury and nl GCS: who needs head CT?](#)

[Minor head injury: Canadian Head CT rule](#)

[Osteoporosis screening \(Dutch instrument\)](#)

[Osteoporosis screening \(ORAI\)](#)

[Osteoporosis screening \(OST\)](#)

[Osteoporosis screening \(SCORE\)](#)

[Prognosis after orthopedic surgery \(POSSUM\)](#)

[Rheumatoid arthritis diagnostic criteria](#)


[Rotator cuff diagnosis](#)

[Septic arthritis diagnosis](#)

[SLE diagnostic criteria](#)

 [Neurology](#)

 [Overall mortality and screening](#)

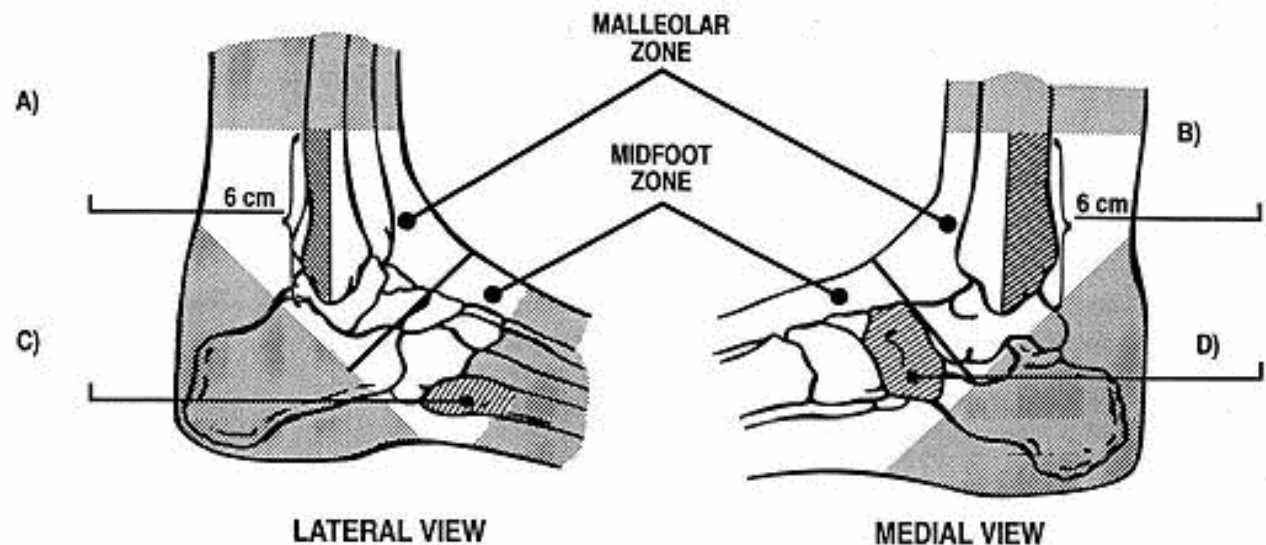
 [Psychiatric and substance abuse](#)

Ottawa Rules for radiography

Indicate which of the following symptoms your patient with foot/ankle injury has:

- Pain in the midfoot
- Inability to bear weight both immediately and in the emergency department (four steps)
- Bone tenderness at the navicular (D) or the base of the fifth metatarsal (C)

Is an x-ray needed?



[More Information Regarding this Rule](#)

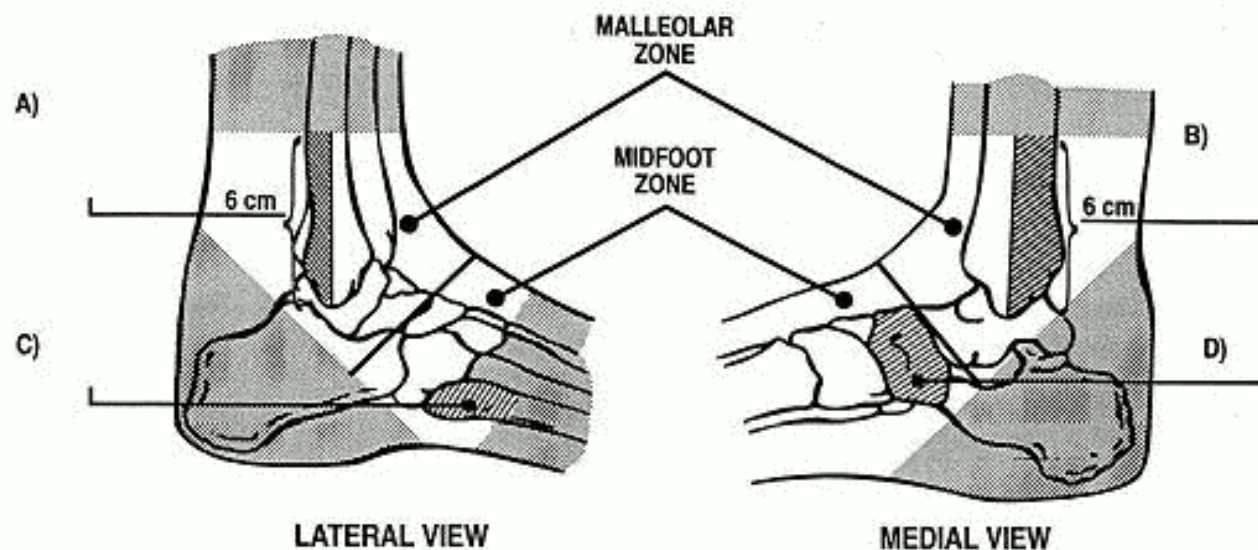
[Return to Clinical Decision Rules and Calculators](#)

Ottawa Rules for radiography

Indicate which of the following symptoms your patient with foot/ankle injury has:

- Pain in the midfoot
- Inability to bear weight both immediately and in the emergency department (four steps)
- Bone tenderness at the navicular (D) or the base of the fifth metatarsal (C)

Is an x-ray needed?



[More Information Regarding this Rule](#)

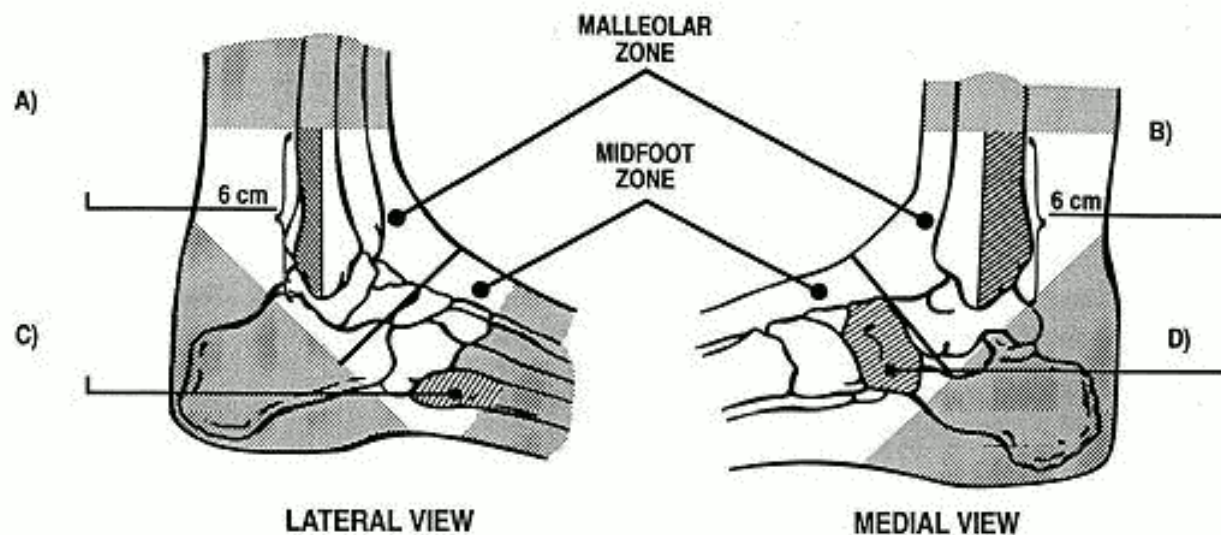
[Return to Clinical Decision Rules and Calculators](#)

Ottawa Rules for radiography

Indicate which of the following symptoms your patient with foot/ankle injury has:

- Pain in the midfoot
- Inability to bear weight both immediately and in the emergency department (four steps)
- Bone tenderness at the navicular (D) or the base of the fifth metatarsal (C)

Is an x-ray needed?

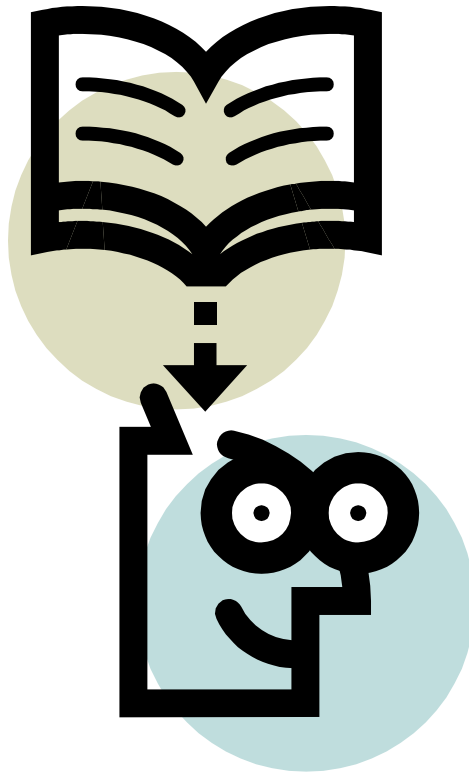


[More Information Regarding this Rule](#)

[Return to Clinical Decision Rules and Calculators](#)



Remember...





Remember...

“It is the quality of thinking and NOT the quantity of facts that is likely to lead to the resolution of clinical problems”.

Marinker, 1976