



# Critical Ultrasound for pre-H trauma management

## Is it about time?

# Critical Ultrasound for pre-H trauma management

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# What if there was something:

That Helps to quickly identify life-threatening conditions as occult bleeding, pnx

Portable on ambulance, HEMS, combact field, pts house....

No side effects

Easy to use

## Would You Use It?

# The Big Questions



# The Big Questions

**IS THERE SOME  
LIFE -THREATENING  
CONDITION?**

**The probability of death increase approximately 1%  
for every 3 minutes in the ED  
Clarke, J Trauma, 2002**

**RUN?**

**STAY AND PLAY?**

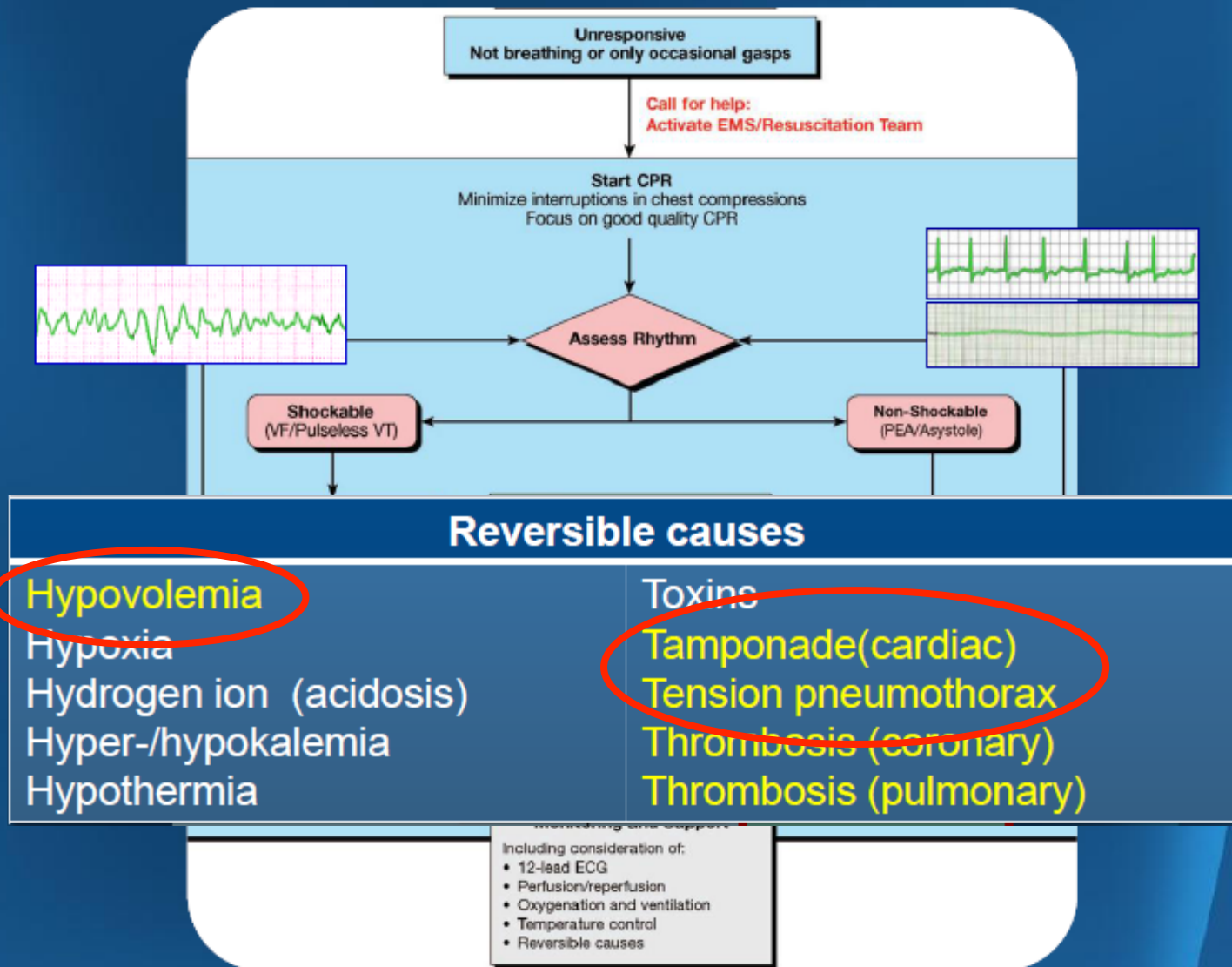
# Critical Ultrasound for trauma

Hemorrhagic Shock remains the major cause of preventable death in trauma patients

Stopping hemorrhage remains a mainstay of trauma care

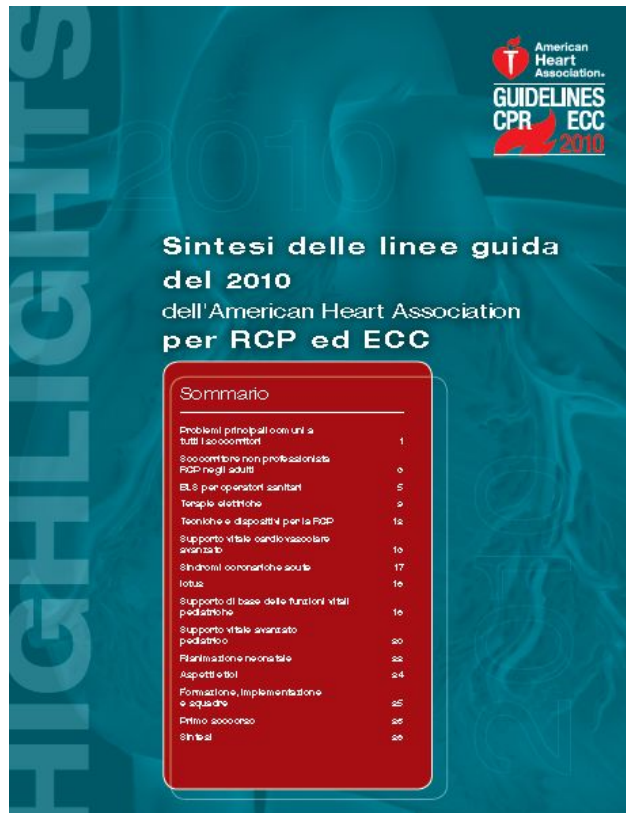
Abdominal bleeding is the “big boss”

# Cardiac Arrest & Periarrest Management



2010 International Consensus on CPR and ECC Science With Treatment Recommendations

# IDENTIFYING AND TREATING REVERSIBLE CAUSES OF CARDIOPULMONARY ARREST



EUROPEAN  
RESUSCITATION  
COUNCIL



Emergency ultrasound can be classified into the following functional clinical categories:

1. *Resuscitative*: ultrasound use as directly related

**ATLS® 2004, 7<sup>a</sup> ed.**



**FAST included in trauma algorithms**

The Association for medical ultrasound  
**aium**  
AMERICAN INSTITUTE OF ULTRASOUND IN MEDICINE

**AIUM Practice Guideline  
for the Performance of the  
Focused Assessment With  
Sonography for Trauma  
(FAST) Examination**



**aium**

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# Cardiac Arrest and Hypotension US protocols

	UHP	AE JONES (UHP+)	TRINITY	FATE	FEER	BLUE	CAUSE	ACES	RUSH (SW)	RUSH (DM)	FEEL	CORE
YEAR	2001	2004	2002	2004	2007	2008	2008	2009	2009	2010	2010	unpub (2010)
WHO	Rose	Jones	Bahner	Jensen	Breitkreutz	Lichtenstein	Hernandez	Atkinson	Weingart	Mandavia	Breitkreutz	Wu
Cardiac	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
..SX		Yes	AND	AND	AND		OR		AND	AND	AND	
..PSLA		Yes	AND	AND	AND (or PSSA)		OR		AND	AND	AND	
..A4C		Yes		AND	AND		OR		AND	AND	AND	
Lung				Yes		Yes	Yes		Yes	Yes		Yes
FAST	Yes	RUQ, PELVIS	Yes					Yes	Yes	Yes		
Aorta	Yes	Yes	Yes					Yes	Yes	Yes (and suprasternal)		Yes
IVC		Yes						Yes	Yes	Yes		Yes
DVT										Yes		Yes
ETT												Yes

# Usefulness, feasibility, added value...



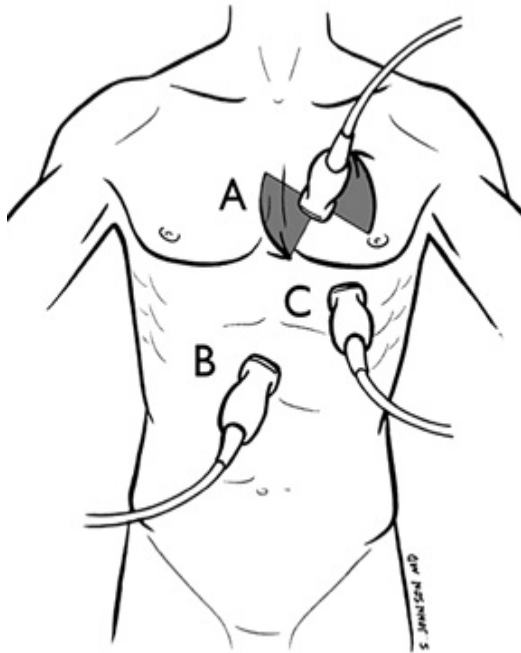
"Explorations with ultrasounds are possible and desirable when a medicalized transport is needed, allowing an early diagnosis of certain severe thoraco-abdominal lesions or of the limbs for the implementation of treatments or of intensive care gestures on field, to orient directly the patient to the best adapted center in its state, to inform the hospital team of the precise lesions, in order not to waste an invaluable time from the accident to the treatment and to ensure transport with a better safety."

Massen H, Mercat C. Intérêt des explorations par les ultrasons dans les véhicules de transport primaires d'urgence des malades ou blessés. Rev SAMU. 1983;7:321-4.

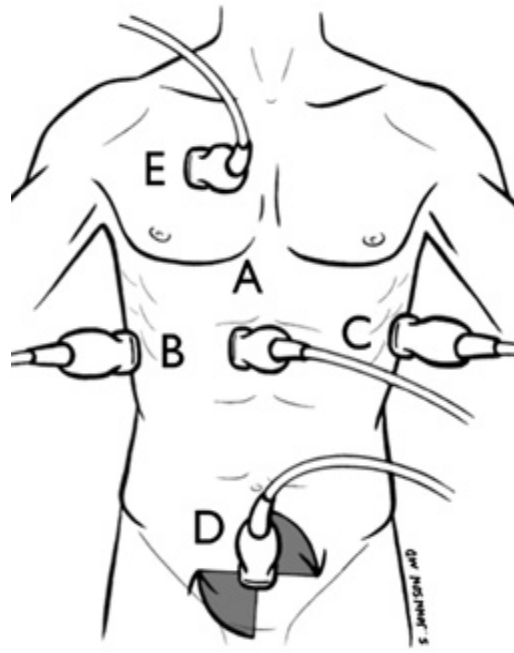
# The RUSH Exam:

## Rapid **U**ltrasound in **S**Hock in the Evaluation of the Critically Ill

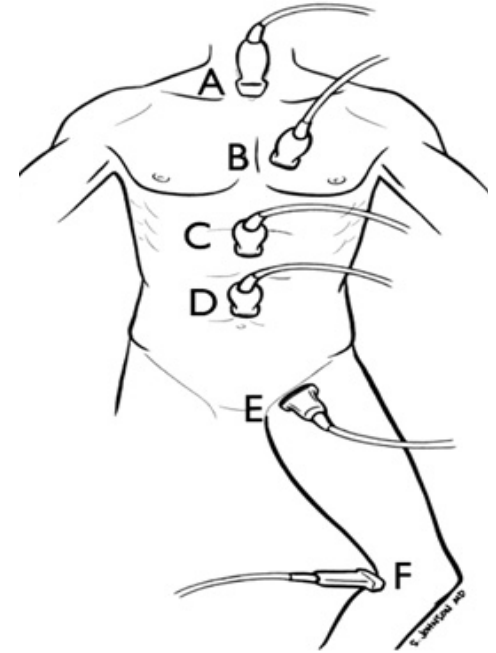
Phillips Perera, T.Mailhot, D. Riley, D. Mandavia



THE "PUMP"



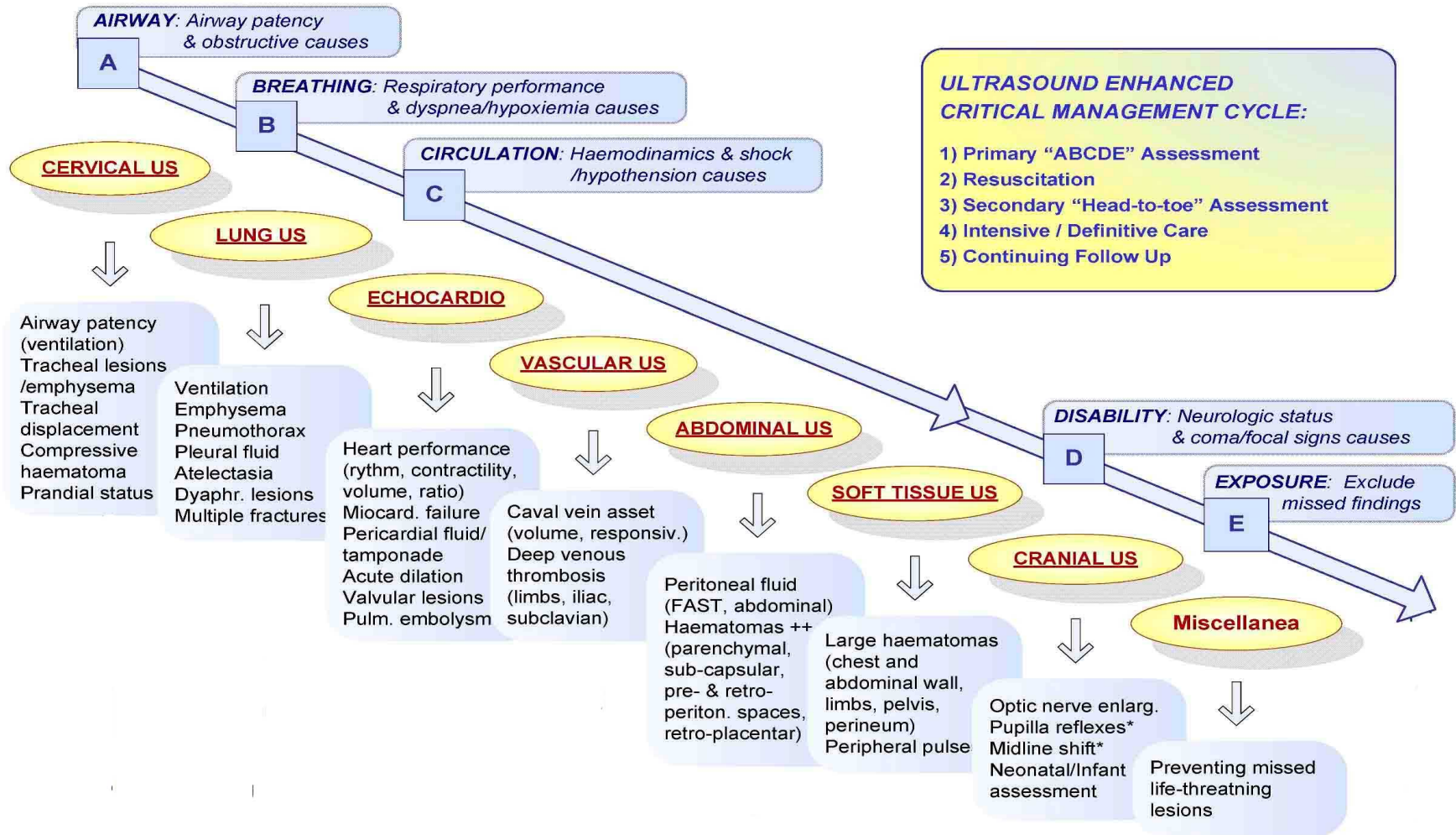
THE "TANK"



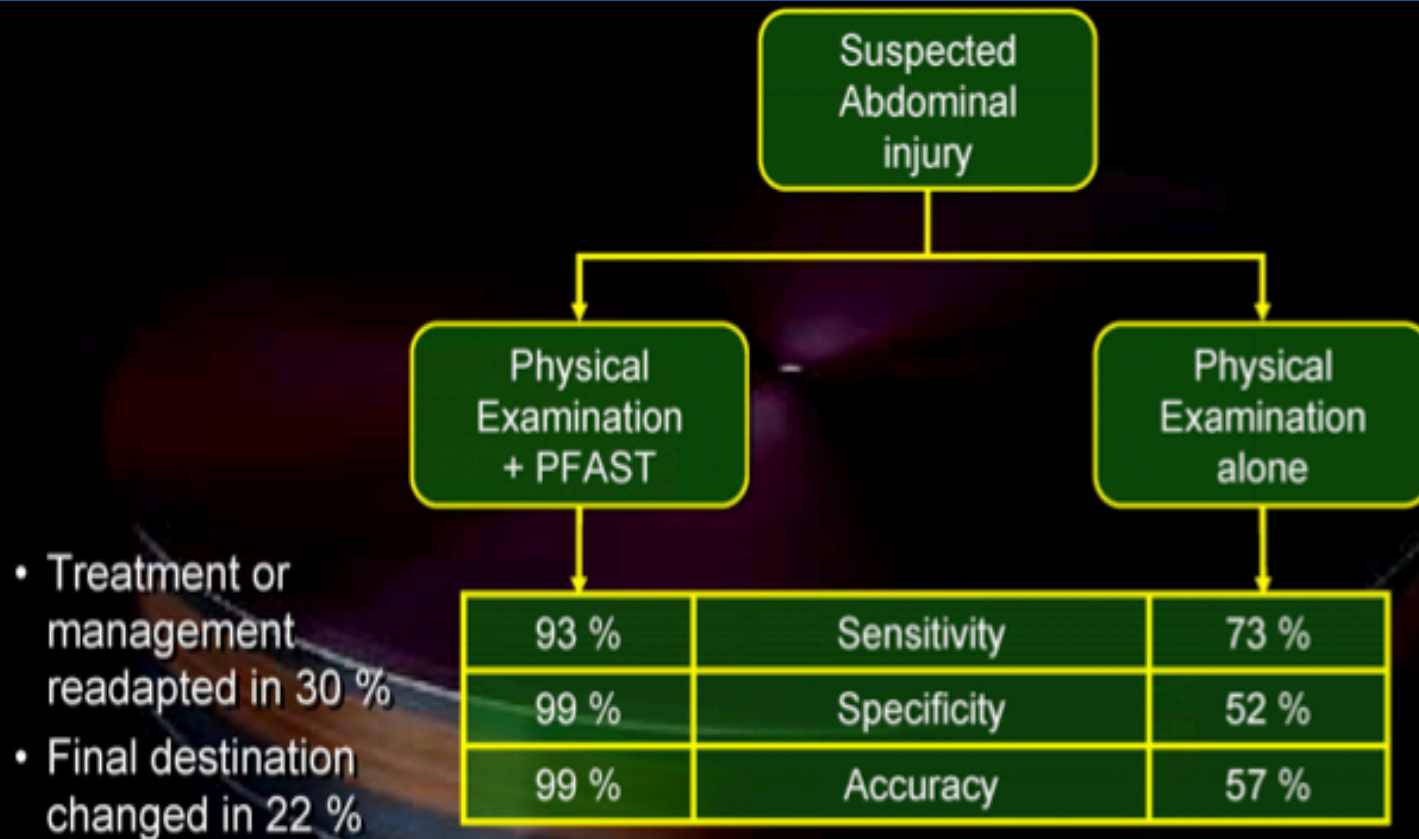
THE "PIPES"

# "LEVEL 1" ULTRASOUND GOALS in TRAUMA CRITICAL CARE

## 1. "ABCDE" PRIMARY ASSESSMENT (Vital signs, anomalies, detectable causes, responses, complications)



Walcher F, Weinlich M, Conrad G, Schweigkofler U, Breitzkreutz R, Kirschning T, Marzi I. Prehospital ultrasound imaging improves management of abdominal trauma. Br J Surg. 2006 Feb;93(2):238-42.



Scanning was made 35 minutes earlier with PFAST than ED US.

# Additional Studies

## **Optimized management of polytraumatized patients by prehospital ultrasound**

Walcher F, Kortum S, Kirschning T, Weihgold N, Marzi I. *Unfallchirurg*.2002;105:986-94

## **Accuracy of prehospital focused abdominal sonography for trauma after a 1-day hands-on training course**

[F. Walcher](#), [T. Kirschning](#), [R. Breitzkreutz](#) et al, *Emerg Med J* 2010;27:345-349

## **Ultrasound in pre-hospital care**

Knudsen L, Sandberg M, *Acta Anaesthesiol Scand* 2011;55:377-378



**CARDIAC  
ULTRASOUND**

**HEPATOBIILIARY  
ULTRASOUND**

**NECK  
ULTRASOUND**

**ONCE UPON  
A TIME...**

**PELVIC  
ULTRASOUND**

**VEIN  
ULTRASOUND**

**RENAL  
ULTRASOUND**



**RESPIRATORY  
DISTRESS**

**SHOCK**

**ABDOMINAL  
PAIN**

**ULTRASOUND  
IN...**

**CHEST PAIN**

**TRAUMA**

**SYNCOPE**

# GOAL-DIRECTED ABDOMINAL ULTRASONOGRAPHY: IMPACT ON REAL-TIME DECISION MAKING IN THE EMERGENCY DEPARTMENT

D. Bassier, et all. J. Emerg Med , 24 :4, 2003

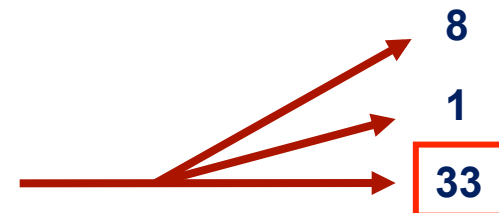
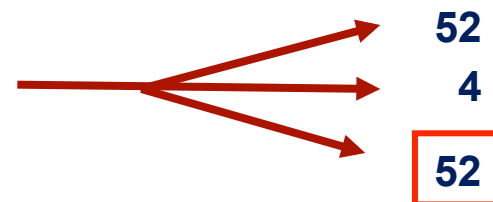
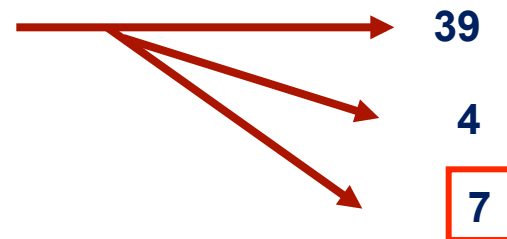
## CLINICAL EVALUATION (200 Paz.)

LOW CERTAINTY OF DISEASE 50  
MODERATE CERTAINTY OF DISEASE  
HIGH CERTAINTY OF DISEASE

LOW CERTAINTY OF DISEASE  
MODERATE CERTAINTY OF DISEASE 108  
HIGH CERTAINTY OF DISEASE

LOW CERTAINTY OF DISEASE  
MODERATE CERTAINTY OF DISEASE  
HIGH CERTAINTY OF DISEASE 42

## CLINICAL EVALUATION +“EU”



92

“That it will ever come into general practice, I am extremely doubtful;

be  
requir  
of tr

ation  
good bit  
nd the

**J. For**  
Preface

eatise”

**London Times, 1854**





**“ABCDE”**

***VISUAL MANAGEMENT***

**VS**

***BLIND MANAGEMENT***