

Some Things That Matter...

...AND SOME THAT
DON'T!

Disclosure

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Conflicts

- I am President of the Society of Professionals in Emergency Care (SoPEC)
 - SoPEC has developed a Canadian Education Program used in many areas of hospitals for Nursing ongoing team training
 - I will reference the CRM and Failures framework used in the programs at the end of this presentation
 - And still...nobody pays me...
-



What I Do...

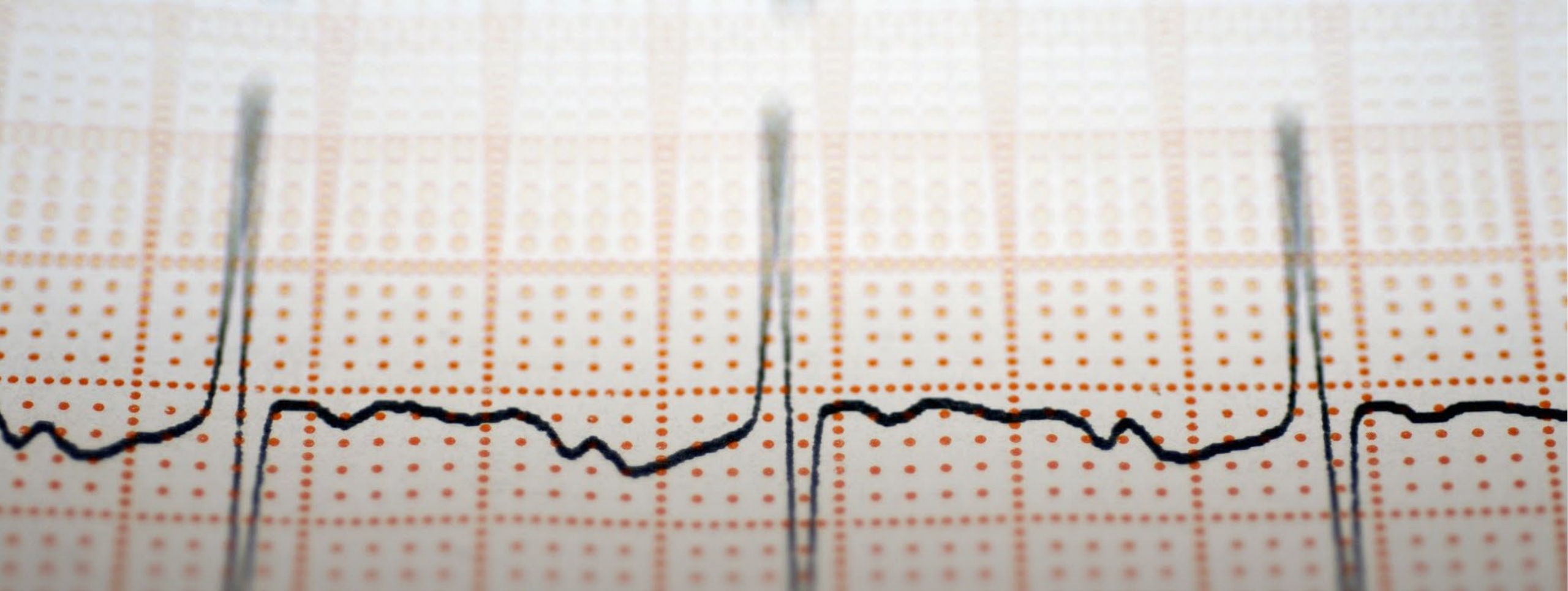
Like my voice?
Monique's is
better...



- ...and don't ask me where Monique is...she's in Israel...
- iTunes, Google, Spotify - NursEM
- www.nurseem.org



What are we doing here?



Vital Signs

THINGS THAT MATTER...

Blood Pressure

Blood Pressure

SYSTOLIC

DIASTOLIC

Strong Heart

110/60

90/60

Strong Vessels

110/60

110/40



Mean Arterial
Pressure
(MAP)

$(2 \times \text{Diastolic}) + \text{Systolic} / 3$

Respiratory Rate

16

28

End-Tidal Carbon Dioxide (ETCO₂)



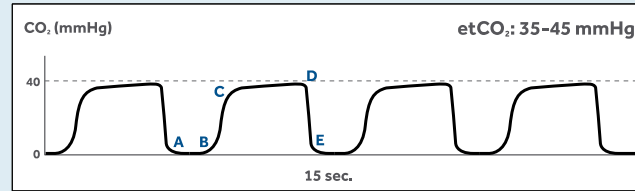
NORMAL AND ABNORMAL etCO_2 /CAPNOGRAPH WAVEFORMS

Normal Capnogram

The normal capnogram is a waveform which represents the varying CO_2 level throughout the breath cycle.

Waveform Characteristics:

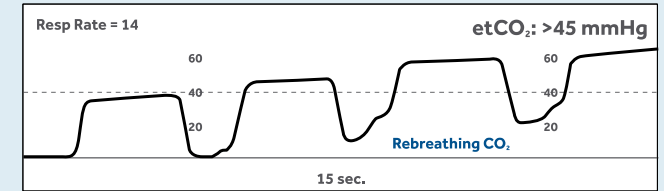
- A-B: Baseline
- B-C: Expiratory Upstroke
- C-D: Expiratory Plateau
- D-E: Inspiration
- D: End-Tidal Concentration



Rebreathing CO_2

Other Possible Causes:

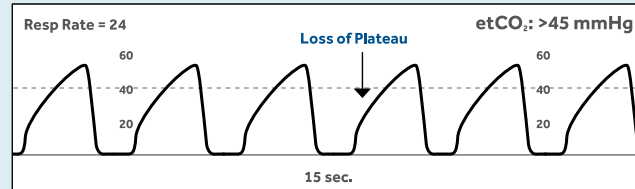
- Faulty expiratory valve
- Inadequate inspiratory flow
- Partial rebreathing
- Insufficient expiratory time



Bronchospasm/Asthma

Other Possible Causes:

- Bronchospasm/COPD
- Obstruction in the expiratory limb of the breathing circuit
- Presence of a foreign body in the upper airway
- Partially kinked or occluded artificial airway



Curare Cleft

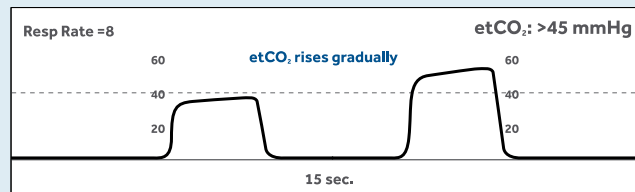
Other Possible Causes:

- Patient is mechanically ventilated
- Depth of cleft is inversely proportional to degree of muscle relaxants

*Increasing etCO_2 (Hypoventilation)

Other Possible Causes:

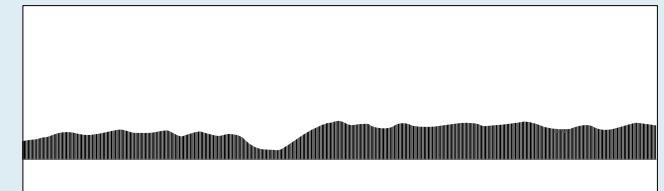
- Decrease in respiratory rate
- Decrease in tidal volume
- Increase in metabolic rate
- Rapid rise in body temperature (malignant hyperthermia)



Cardiac Arrest

Other Possible Causes:

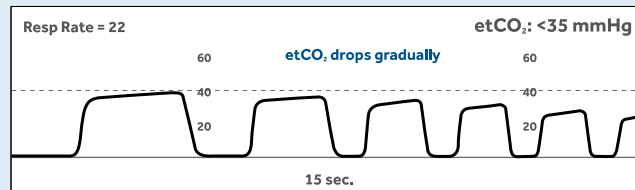
- Decreased or absent cardiac output
- Decreased or absent pulmonary blood flow
- Sudden decrease in CO_2 values



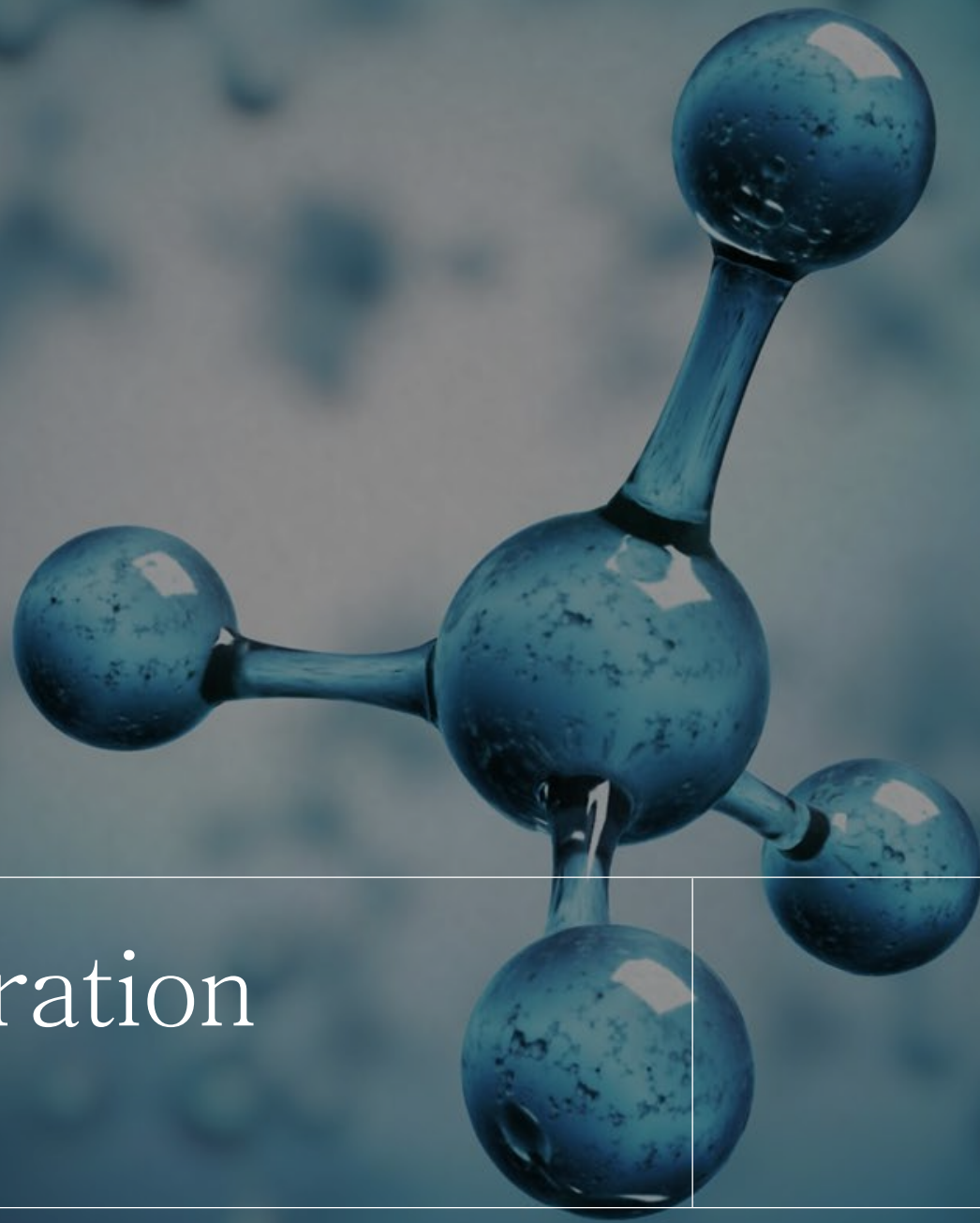
*Decreasing etCO_2 (Hyperventilation)

Other Possible Causes:

- Increase in respiratory rate
- Increase in tidal volume
- Metabolic acidosis
- Fall in body temperature

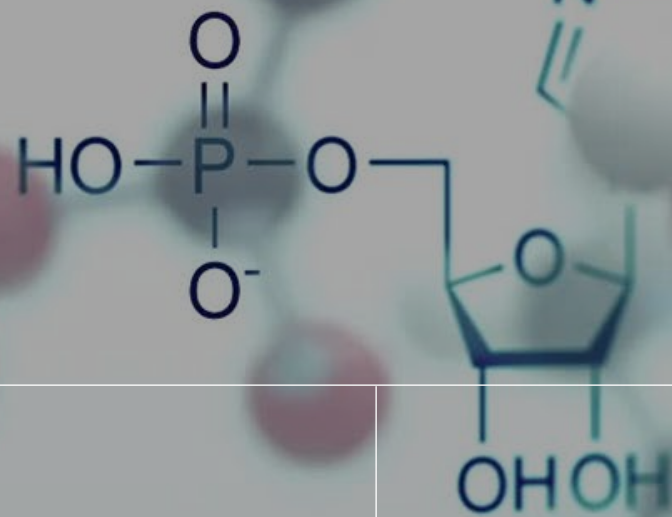


...AND SOME
THINGS THAT
DON'T...



“Oxygen” Saturation
(SpO₂)

“Carbon Monoxide” Saturation (SpCO)





Pupils

FIXED DILATED PUPILS

(greater than 4 - 5mm)

PARASYMPATHETIC PARALYSIS

SYMPATHETIC STIMULATION

MISCELLANEOUS

DRUGS

(Parasympatholytic)

Atropine
Scopolamine
Homatropine
Cyclopentolate
Quinine toxicity
Tricyclic overdose
Antihistamine overdose
Glutethimide overdose
Trimetaphan
Hypermagnesaemia

NEUROPATHY

III Nerve Paralysis

Guillain Barre
Botulism
Diphtheria
Raised intracranial pressure
CNS Diseases
Syphilis
Encephalitis
Diabetes mellitus
Multiple sclerosis
Trauma
Envenomation
Snakes eg; Taipan
Funnel web spider
Puffer fish (tetrodotoxin)
Australian blue-ringed octopus

DRUGS

(Sympathomimetic)

Phenylephrine
Ephedrine
Cocaine
Adrenaline
Noradrenaline
Dopamine
Amphetamine overdose
Bretylum intoxication

PHAEOCHROMOCYTOMA

Cardiac arrest
Cyanide Poisoning
Hypothermia
Barbiturate overdose
Methanol poisoning
Deep anaesthesia
Propranolol overdose
Total spinal anaesthetic
Benzalkonium chloride

Back to What
Matters...

The Carbonic Acid Equation

SOME THINGS THAT
MATTER!

The Equation of Life...





Calcium

- Allows smooth muscle contraction (i.e., blood vessel walls)
- Increases volume through renin-angiotensin-aldosterone system
- Ionized and Non-Ionized Calcium are two different things!

- Calcium loss in banked blood is a relevant and often missed phenomenon
 - Calcium is not in most crystalloids used in emergency situations - you are potentially diluting your calcium to low levels
-

Scales and Tools

THINGS THAT MATTER...

Glasgow Coma Scale (GCS)

Glasgow Coma Scale		
Response	Scale	Score
Eye Opening Response	Eyes open spontaneously	4 Points
	Eyes open to verbal command, speech, or shout	3 Points
	Eyes open to pain (not applied to face)	2 Points
	No eye opening	1 Point
Verbal Response	Oriented	5 Points
	Confused conversation, but able to answer questions	4 Points
	Inappropriate responses, words discernible	3 Points
	Incomprehensible sounds or speech	2 Points
	No verbal response	1 Point
Motor Response	Obeys commands for movement	6 Points
	Purposeful movement to painful stimulus	5 Points
	Withdraws from pain	4 Points
	Abnormal (spastic) flexion, decorticate posture	3 Points
	Extensor (rigid) response, decerebrate posture	2 Points
	No motor response	1 Point

Minor Brain Injury = 13-15 points; **Moderate Brain Injury** = 9-12 points; **Severe Brain Injury** = 3-8 points

Canadian CT Head Rule

CT head is only required for minor head injury patients with any one of these findings:

High Risk (for Neurological Intervention)

- 1. GCS score < 15 at 2 hrs after injury**
- 2. Suspected open or depressed skull fracture**
- 3. Any sign of basal skull fracture***
- 4. Vomiting \geq 2 episodes**
- 5. Age \geq 65 years**

Medium Risk (for Brain Injury on CT)

- 6. Amnesia before impact \geq 30 min**
- 7. Dangerous mechanism ** (*pedestrian, occupant ejected, fall from elevation*)**

CT Head Rules

The Canadian C-Spine Rule

Please check off all choices within applicable boxes:

1. Any One High-Risk Factor Which Mandates Immobilization?

No Yes

- Age \geq 65 years
OR
 Dangerous mechanism *
OR
 Numbness or tingling in extremities

Yes

No

2. Any One Low-Risk Factor Which Allows Safe Assessment of Range of Motion?

No Yes

- Simple rearend MVC **
OR
 Ambulatory at any time at scene
OR
 No neck pain at scene when asked
(answer "yes" if no pain)
OR
 No pain during midline c-spine palpation
(answer "yes" if no pain)

No

C-Spine
Immobilization

Unable

Yes

3. Patient Voluntarily Able to Actively Rotate Neck 45°
Left and Right When Requested, Regardless of Pain?

No Yes

Able

No C-Spine
Immobilization ***

* Dangerous Mechanism

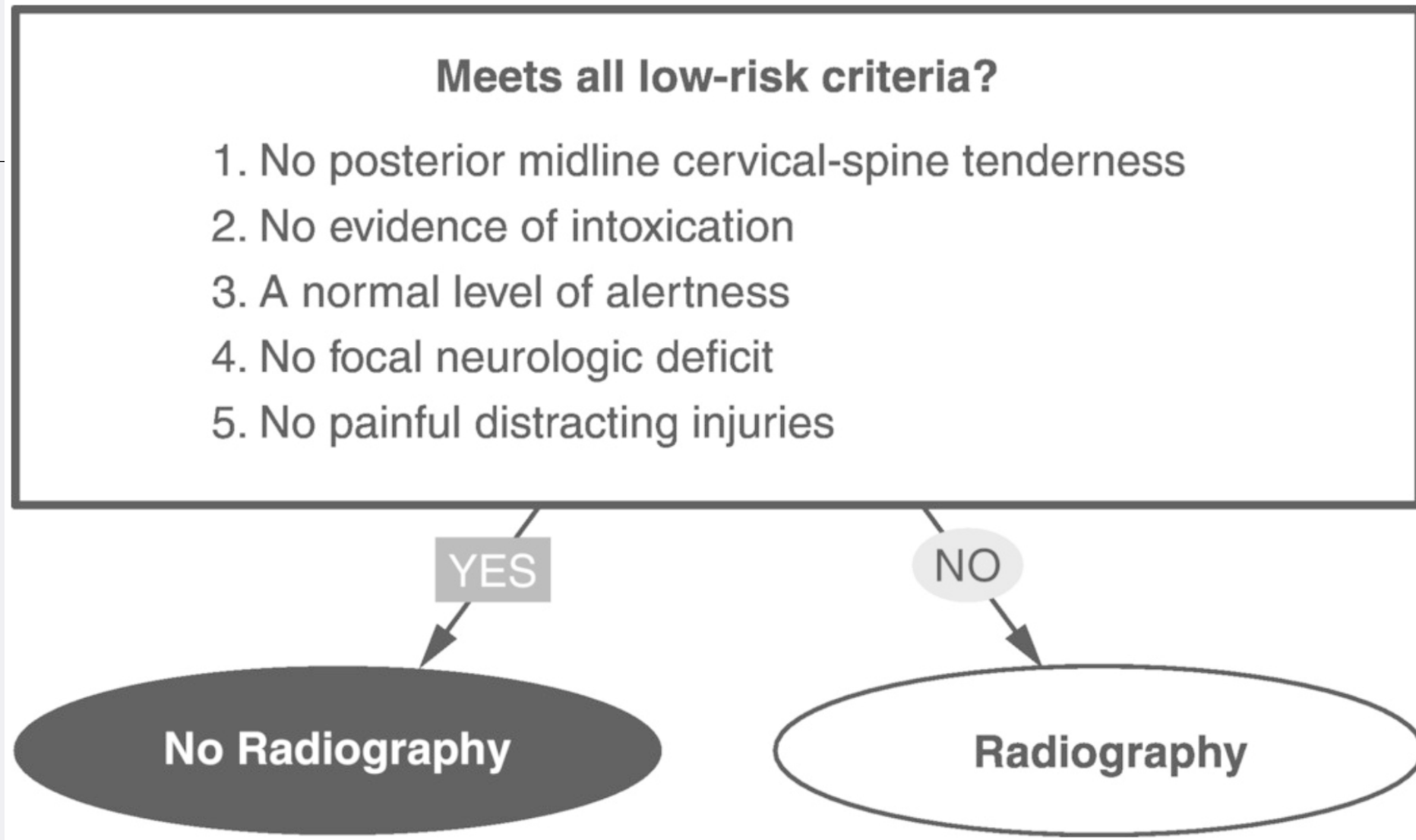
- fall from elevation \geq 3feet/5 stairs
- axial load to head, e.g. diving
- MVC high speed (\geq 100km/hr), rollover, ejection
- motorized recreational vehicles e.g. ATV
- bicycle collision with object e.g. post, car

** Simple Rearend MVC Excludes:

- pushed into oncoming traffic
- hit by bus/large truck
- rollover
- hit by high speed vehicle (\geq 100 km/hr)

Spine Rules

Spine Rules



Syncope Score

Category	Points
Clinical evaluation	
Predisposition to vasovagal symptoms ^a	-1
History of heart disease ^b	1
Any systolic pressure reading <90 or >180 mm Hg ^c	2
Investigations	
Elevated troponin level (>99th percentile of normal population)	2
Abnormal QRS axis (<-30° or >100°)	1
QRS duration >130 ms	1
Corrected QT interval >480 ms	2
Diagnosis in emergency department	
Vasovagal syncope	-2
Cardiac syncope	2
Total score (-3 to 11)	

Wells Criteria for DVT

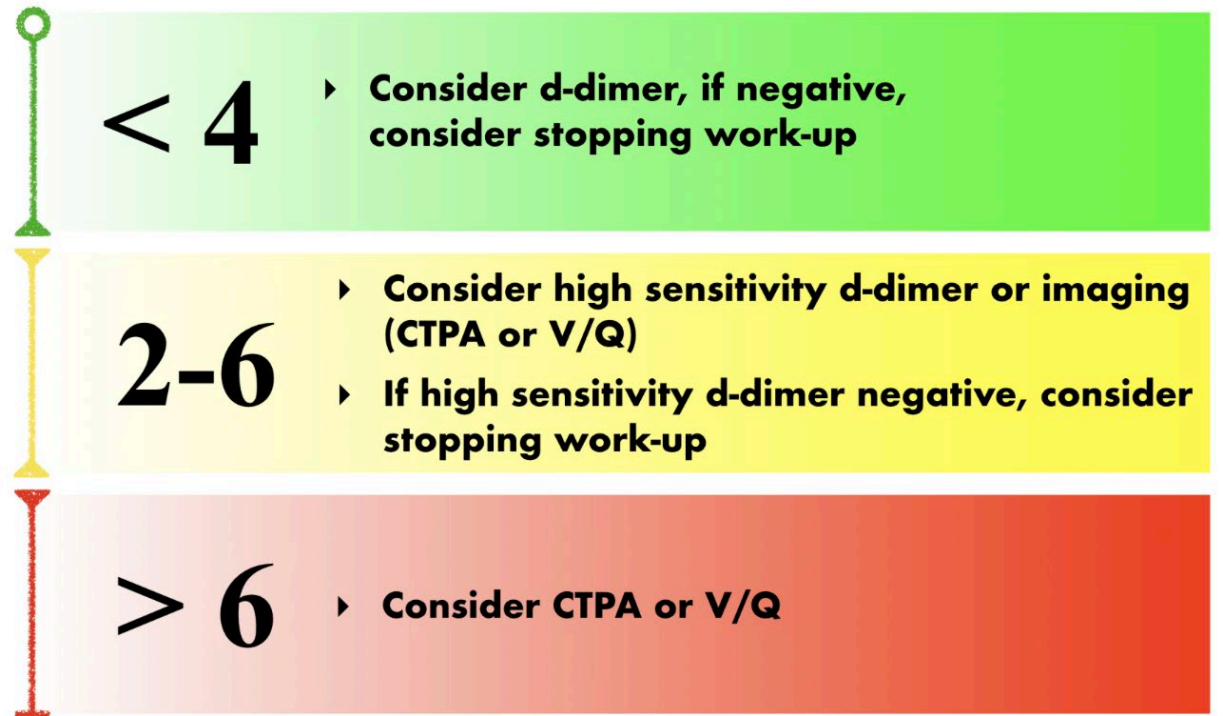
- Score >2.0 – High (probability 53%)
- Score 1.0 to 2.0 – Moderate (probability 17%)
- Score <2.0 – Low (probability 5%)

Wells Score Criteria Description	Points
Active Cancer (treatment within last 6 months or palliative)	+1 point
Calf swelling \geq 3 cm compared to asymptomatic calf (measured 10 cm below tibial tuberosity)	+1 point
Swollen unilateral superficial veins (non-varicose, in symptomatic leg)	+1 point
Unilateral pitting edema (in symptomatic leg)	+1 point
Previous documented DVT	+1 point
Swelling of entire leg	+1 point
Localized tenderness along the deep venous system	+1 point
Paralysis, paresis, or recent cast immobilization of lower extremities	+1 point
Recently bedridden \geq 3 days, or major surgery requiring regional or general anesthetic in the past 12 weeks	+1 point
Alternative diagnosis at least as likely	-2 points

Wells Criteria for PE

Criteria	Points
Clinical signs and symptoms of DVT	3
PE is #1 diagnosis OR equally likely	3
Heart rate > 100	1.5
Immobilization at least 3 days OR surgery in the previous 4 weeks	1.5
Previous, objectively diagnosed PE or DVT	1.5
Hemoptysis	1
Malignancy with treatment within 6 months or palliative	1

3 Tier Model



Pain Management Spectrum

THINGS THAT MATTER...

Pain Management

Why Care?

- Increased Cardiac Demands
- Unmanaged Acute Pain Leads to Increased Chronic Pain
- Delayed Healing
- Impaired Sleep
- Impaired Physical Function (and Downstream Effects)
- Cost of Return Visits

Escalate Your Strategy

Tylenol / Ibuprofen

Penthrox / Entonox

NSAIDS

Gabapentin

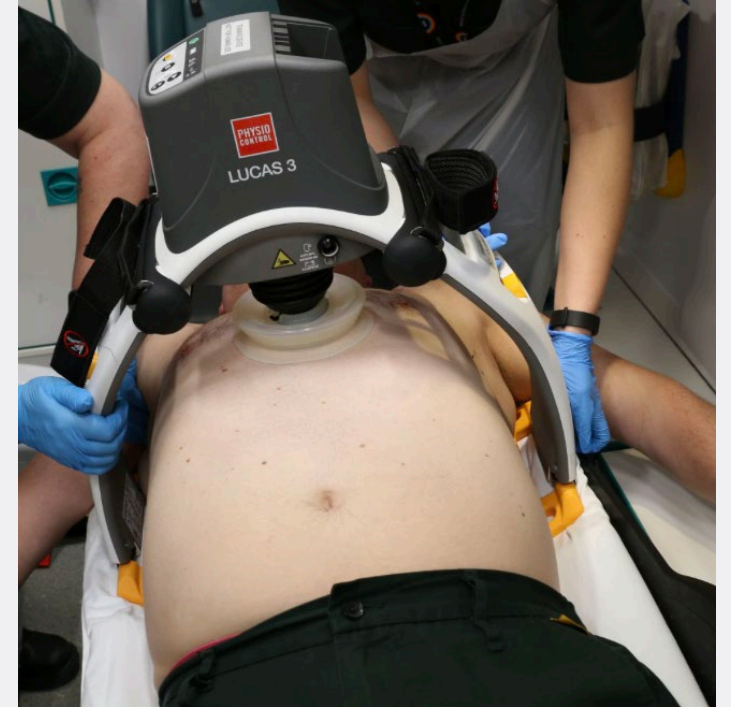
Ketamine / Lidocaine

Opioids

Crew Resource Management

THINGS THAT MATTER...

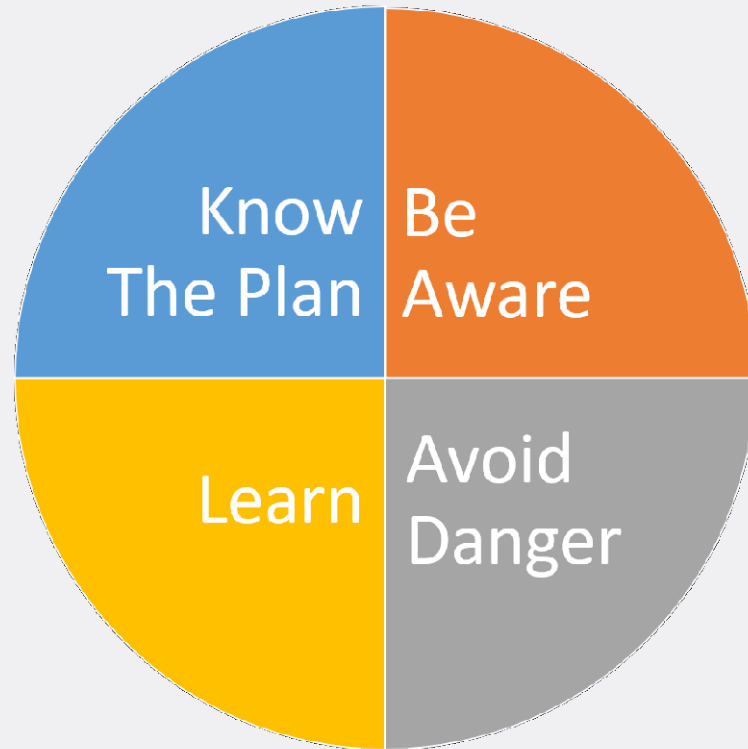
A Funny
Thing at Work
the Other
Day...



Harvard Model



EPICC Model



EPICC Failures Model



Failure to Assess



Failure to Recognize



Failure to Act



Failure to Communicate



Failure to Escalate

EPICC Failures Model

Assess

- I didn't even assess blood pressure

Recognize

- I didn't know a BP of 80/50 was bad

Act

- I knew the BP was low but didn't do anything about it

Communicate

- Didn't tell anyone or didn't do it in a way that the message came across well

Escalate

- The provider didn't want to do anything and even though I thought they should, I didn't advocate any further
-

EPICC Failures Model

Assess

- Checklists

Recognize

- Education

Act

- Practice Supports and/or Performance Management

Communicate

- SBAR-Type Tools and/or Performance Management

Escalate

- Organizational Culture and/or Performance Management
-