



# “I CAN’T BREATHE”

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Husband and Father



# GOALS AND OUTLINE

- Case review
- Review anatomy/respiratory physiology
- Discuss VENTILATION management
- Strategies for success





# YOU HAVE THE TOUGHEST JOB IN THE WORLD

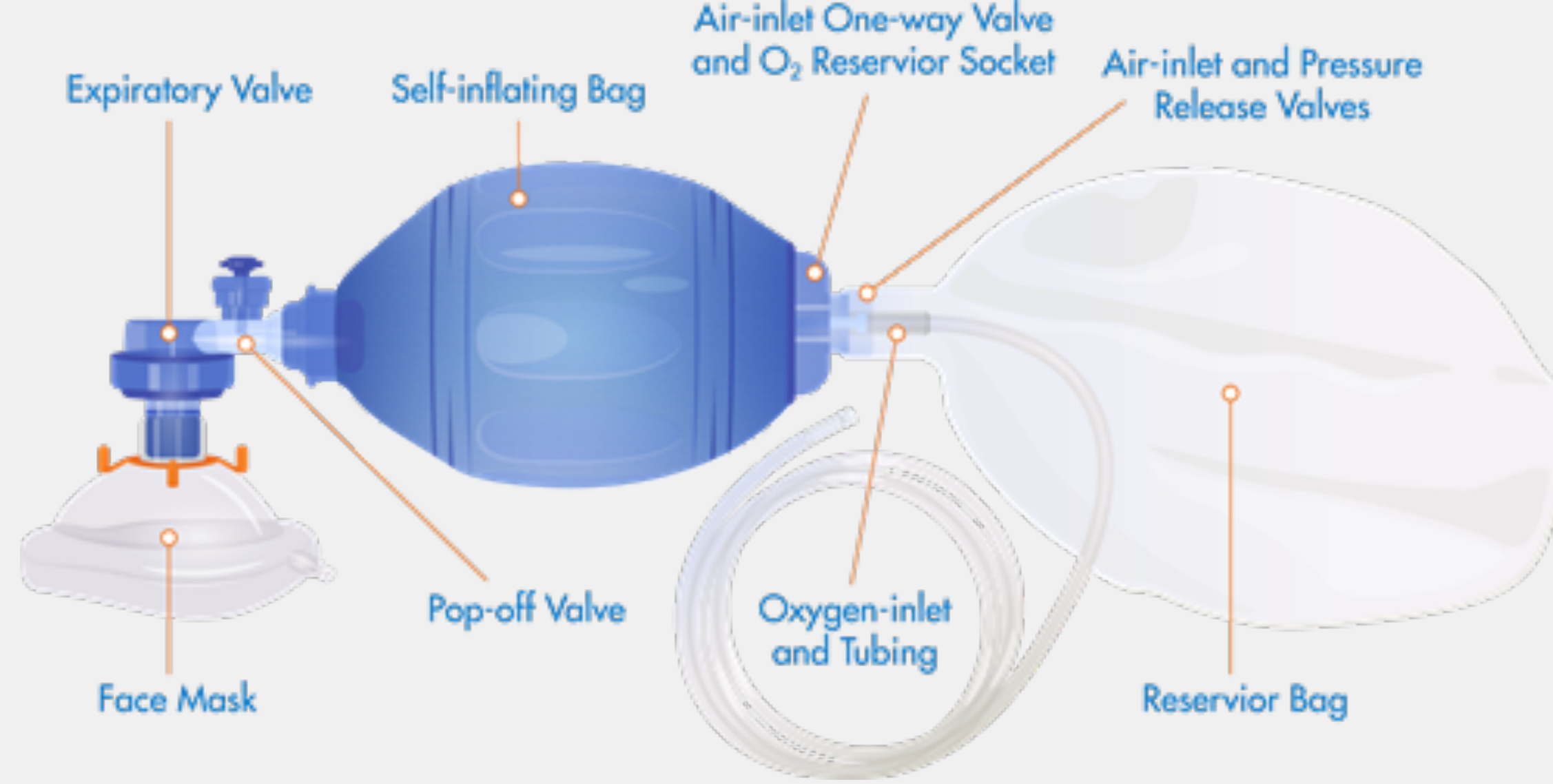




# CONSIDER THIS....

- 44 y/o male calls 911 for difficulty breathing h/o asthma
- Pt is fatigued and respiratory failure seems imminent
- Despite meds and nebs his condition worsens.
- What next?





- Good compliance. Prolong expiratory phase with respirations and manual compression of chest, sats are good.
- Paramedic prepares to intubate
- Pt is moved to floor....





- Tube placed and with ventilations comes vomit
- Tube removed and BVM used
- *Second* attempt: Tube placed and +BS, no epigastric sounds, misting in tube
- EtCO2 monitor with capnography placed.
- **“There’s something wrong with the monitor, but breath sounds are still good! Let’s just get this guy to the hospital”**





- **ER DOC doesn't hear breath sounds but hears gurgling**
- **DL done and ETT is in the esophagus**
- **Re-intubates pt and color improves with confirmation**
- **Pt over hours deteriorates over time and pt codes and dies (cerebral edema from profound prolonged hypoxia)**



# **THE FALLOUT**

- **The monitor is sent to manufacturer and functionally normally**
- **QA performed and remediation to paramedic on the call**
- **6 months later suit is filed against EMS service and Medical Director**
- **2 years later case settles: \$2.4 Million**



# WHY ARE WE TALKING ABOUT THIS?

- Not every patient needs to be intubated
- This subject is under constant scrutiny
- Advanced airway techniques can cause more harm than good
- There are other considerations to achieve the same objective



# JUST OPEN THE JOURNALS....

- The Future of Paramedic Intubation: Who Should be Responsible? *Journal of Paramedic Practice*
- Maybe Paramedics Should Not Perform Endotracheal Intubation *NEJM*
- Experts Debate Paramedic Intubation *JEMS*
- Securing the Prehospital Airway: a Comparison of Laryngeal Mask Insertion and Endotracheal Intubation by UK Paramedics, *Emergency Medicine Journal*



# EMS HISTORY OF INTUBATION

- Based off physician out of hospital ETI in 1960's to 1970's
- Early studies were demonstrating excellent success but there were physicians on scene (ACS, trauma, unconscious)
- Concerns arose in pediatric populations 1990's in particular with trauma (Survival rates dropped)

- **What matters:**

- **Quality of training and education**
- **Frequency of skill**
- **On-sight supervision and active QA/QI**





# SO HOW MANY TO BE PROFICIENT?

- **Wang, et al (2006): 15-20 *successful attempts***
- **Reed (2007) suggested success plateaued about attempt #30**
  - ***Noted the level of provider experience was inversely proportional to complications and/or the need for multiple attempts.***
- **Konrad et al (1999) : 57 attempts (*possibly up to 80*)**
- **Cunningham (2021): 50 + intubations**
- **Pepe (2015): Over 100 times?**
  - ***That would mean 20 procedures over 5 years***





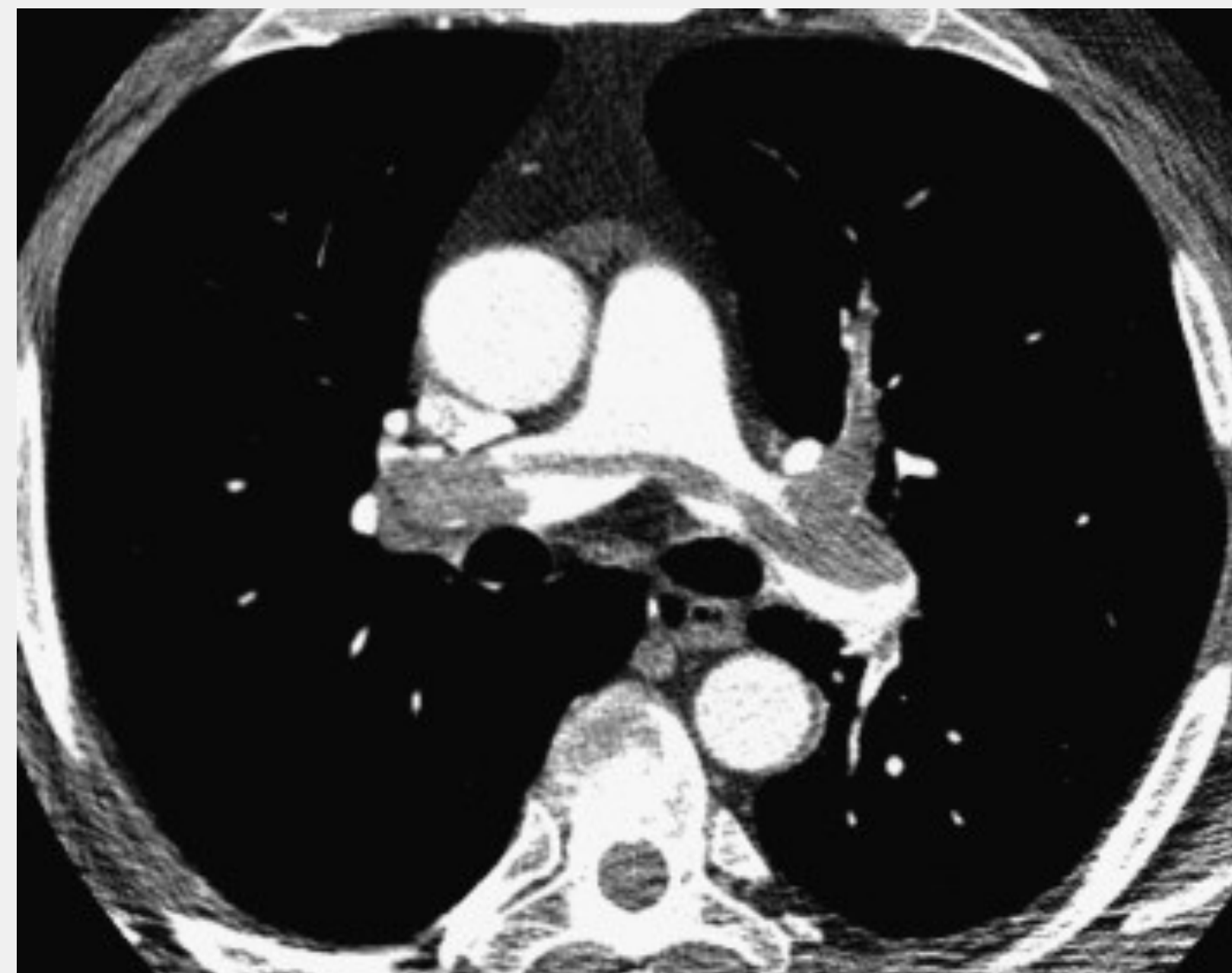
# CONCEPTS OF AIRWAY AND VENTILATORY MANAGEMENT

- Boils down to understanding anatomy and physiology
- Goals of treatment
- What is best for the patient



# CONSIDERATIONS FOR DYSPNEA

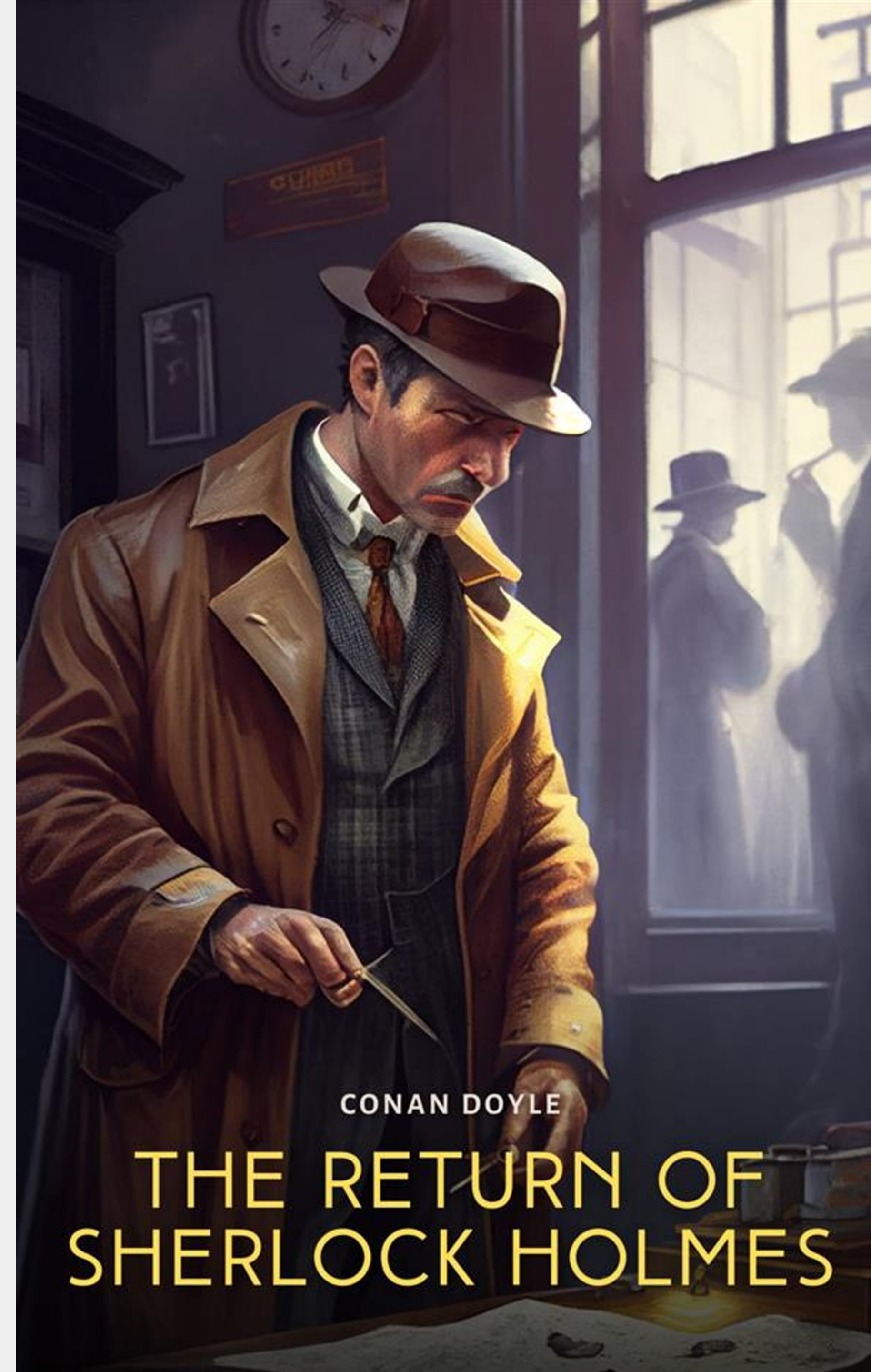
- PE
- Pneumothorax
- Toxicologic
- Acidosis
- Anemia
- Anaphylaxis
- Pleural Effusion
- CO poisoning
- Arrhythmia
- Thyrotoxicosis





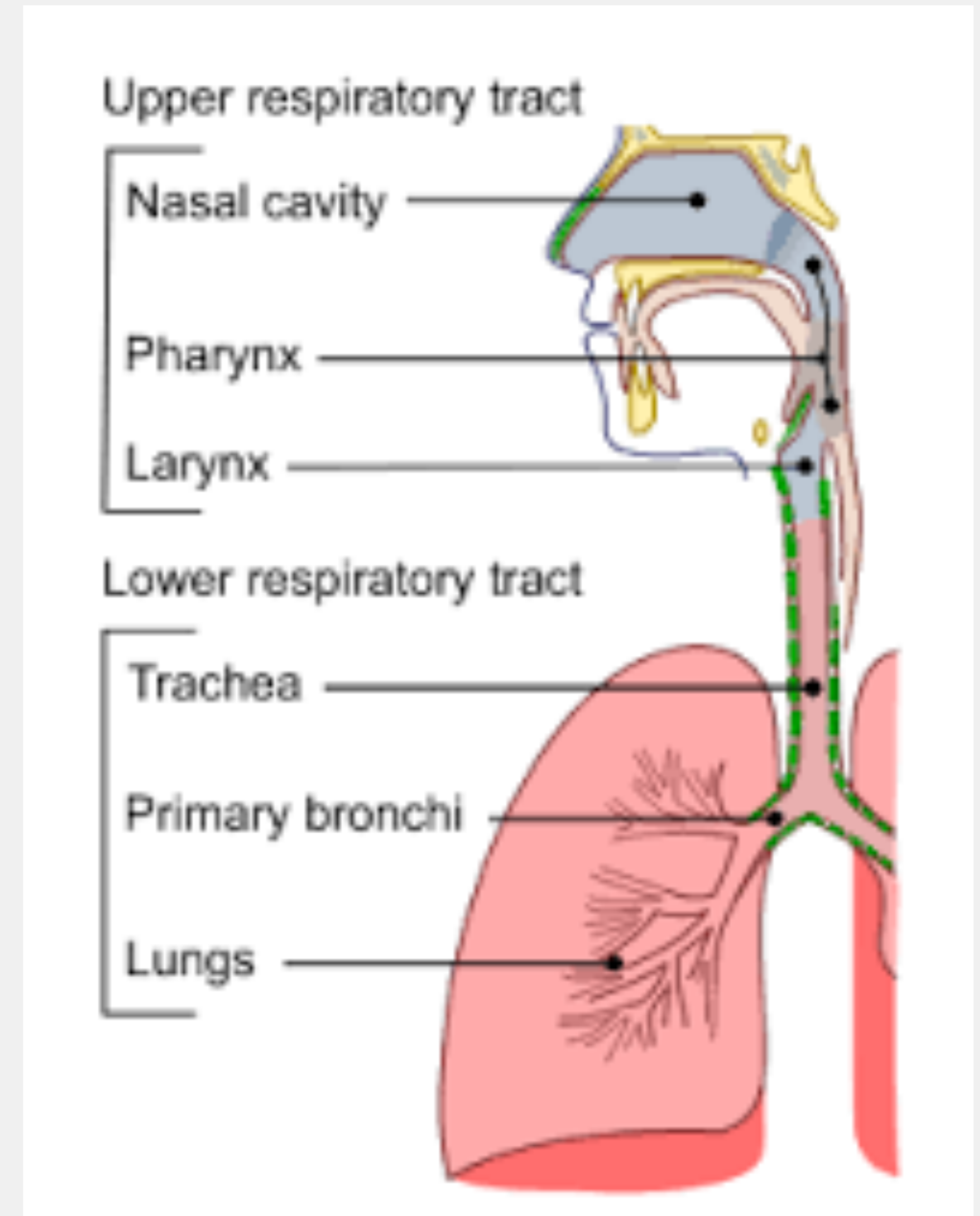
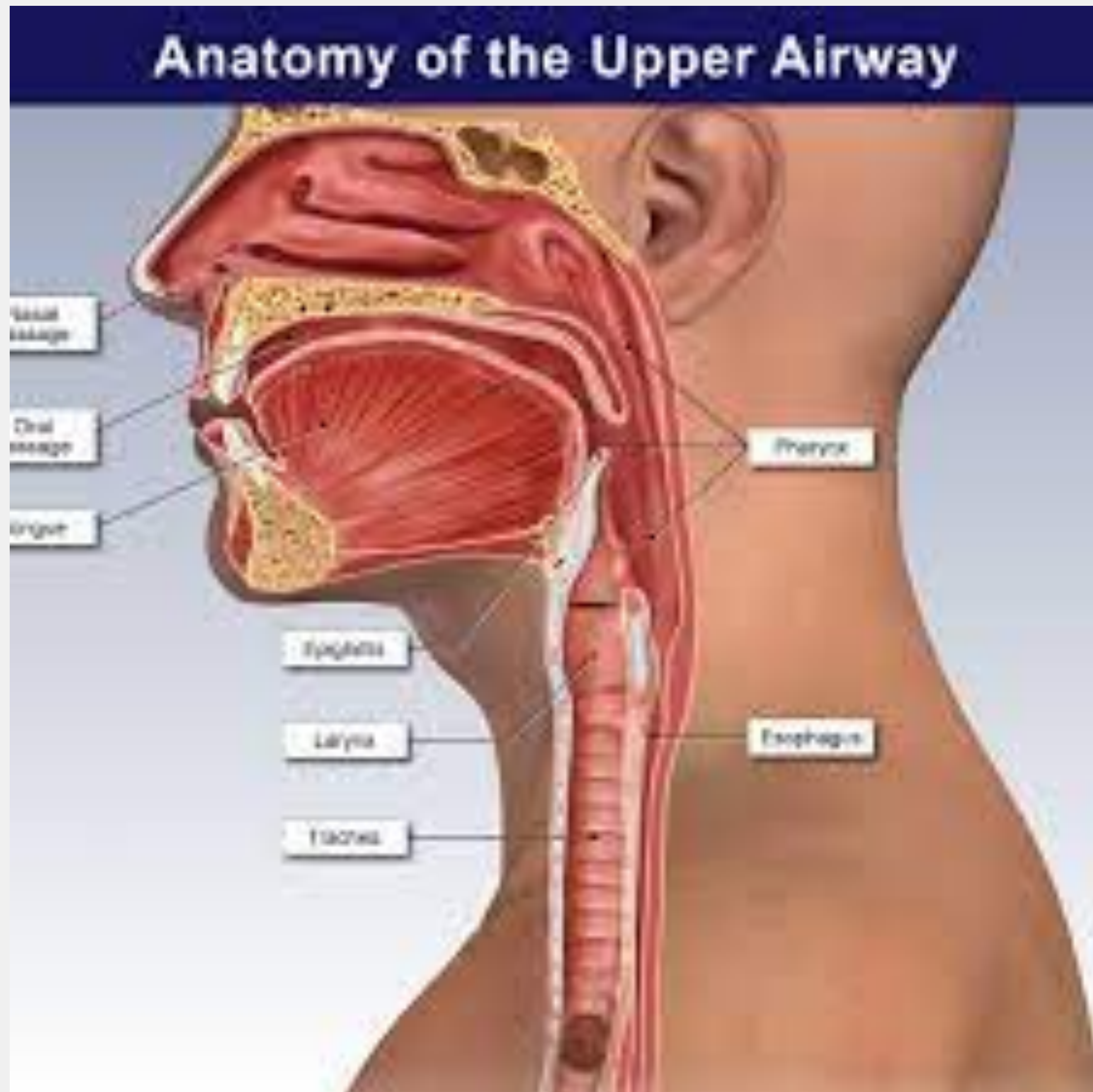
# WHY IS THIS IMPORTANT?

- Shortness of breath may be multifactorial.....
- Understanding the cause will help with treatment
- Let's start with brief anatomy review



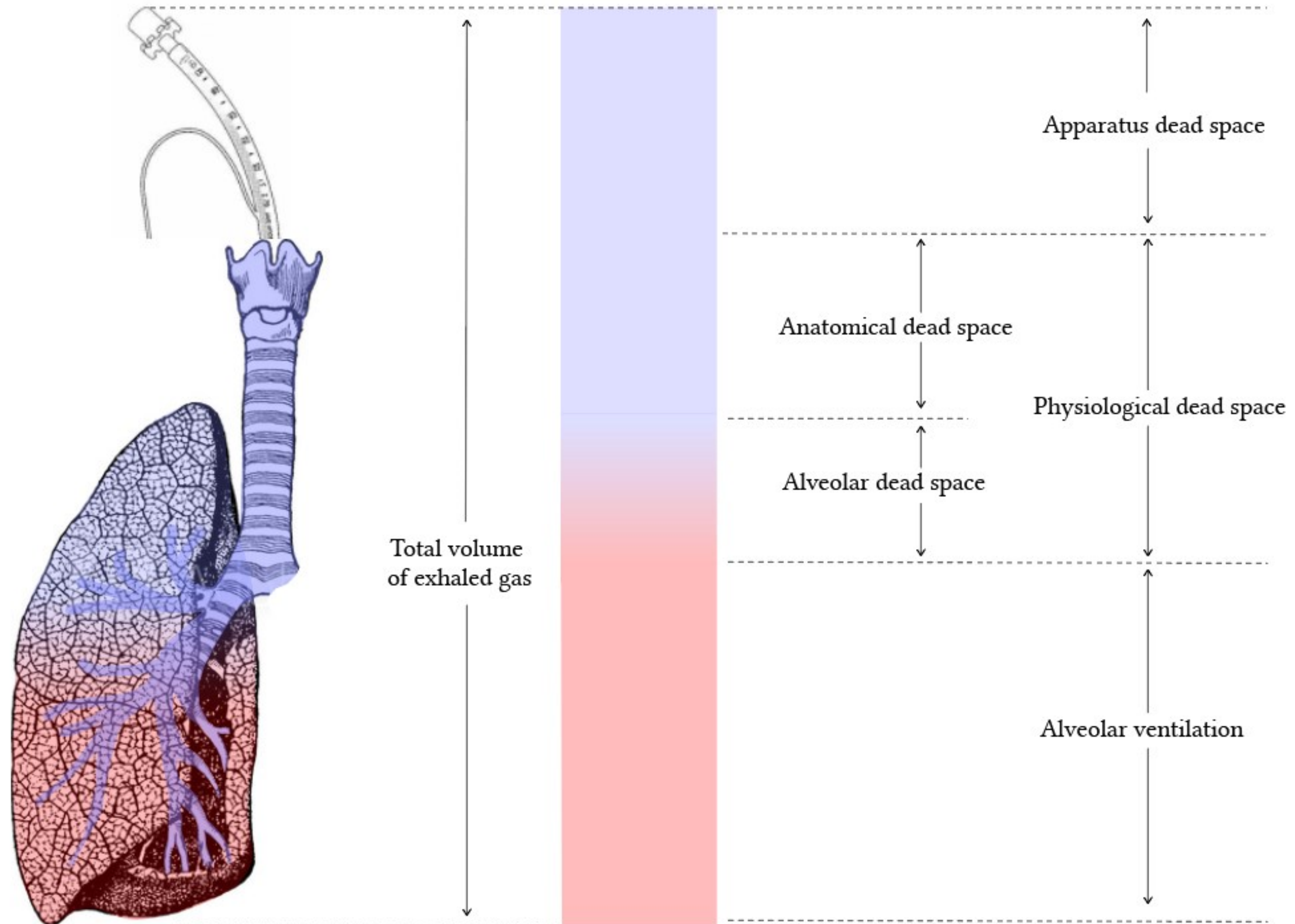


# ANATOMY AND TERMS



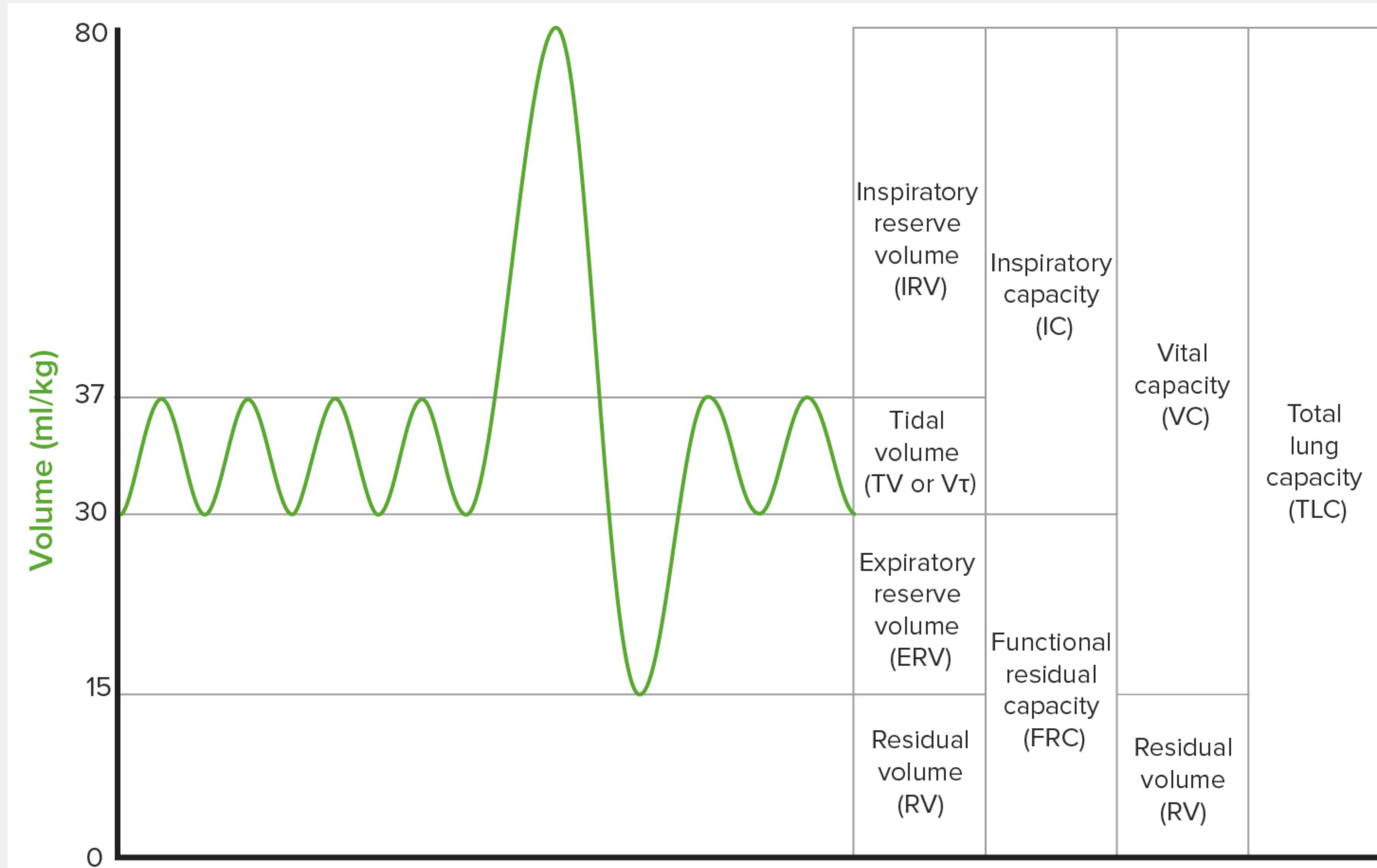


# ANATOMIC DEAD SPACE





# RESPIRATORY MECHANICS





# DETERMINE YOUR CIRCUMSTANCE

- Scene size up
- Barriers to care
- Equipment needs
- Available personnel to assist? Expertise?
- How far are you from definitive care?





# DETERMINE YOUR CIRCUMSTANCE

## Equipment needs

- What do you bring to the patient on every call?
- What do you have available when you need it?
- How much O<sub>2</sub> do you have?





# DETERMINE YOUR CIRCUMSTANCE

- How far are you from definitive care?





# SOMEONE SAYS THEY ARE SHORT OF BREATH

- **Step 1:**

- Believe them
- Assess LOC
- They are talking to you. GREAT! Take a breath (but don't relax)
- Body positioning (supine/stridor/drooling/audible wheezing)



# ASSESSMENT

- **Step 2:**

- Airway (patent or not?) If NOT then fix it
- Breathing (accessory muscle use/increased WOB or hypoventilating)
  - Auscultate (Upper/Lower/Can't tell?)
- Circulation (how fast or slow is the pulse)



# OXYGEN/CO<sub>2</sub>/MECHANICAL ASSISTANCE OR ALL 3?



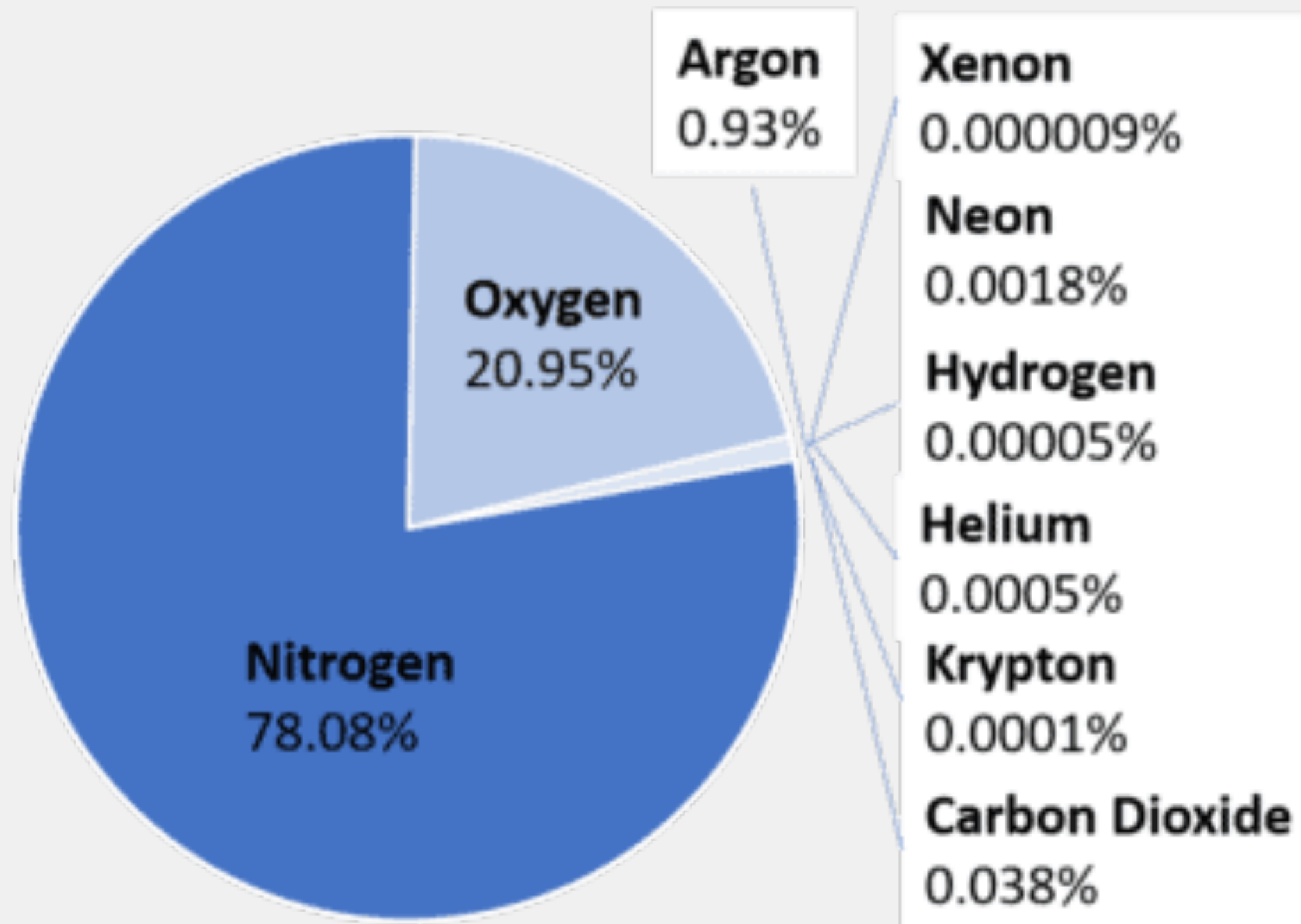


# HERE IS WHAT YOU PAID FOR

- **Oxygen**
  - PEEP or FiO<sub>2</sub>
- **Carbon Dioxide**
  - Tidal Volume or Ventilatory Rate
- **Mechanical Assistance** (invasive or non-invasive)



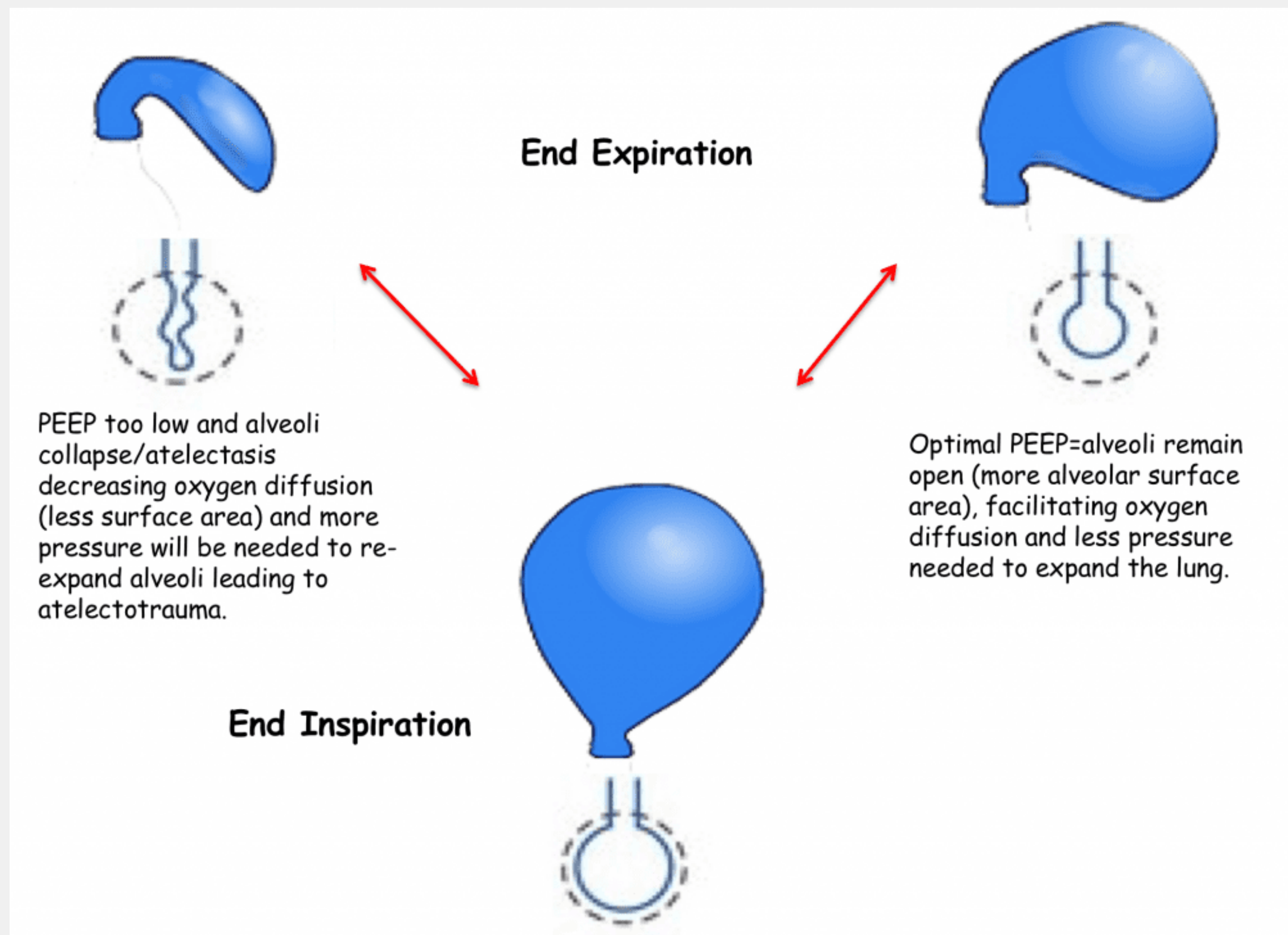
# OXYGEN



Oxygen Device Type	%FiO <sub>2</sub> obtained
Nasal Cannula	24-40% FiO <sub>2</sub>
Oxymizer	24-60% FiO <sub>2</sub>
Simple Face Mask	35-55% FiO <sub>2</sub>
Venturi Face Mask	24-60% FiO <sub>2</sub>
Non-rebreather	60-95% FiO <sub>2</sub>
High-Flow Nasal Cannula	20-100% FiO <sub>2</sub>
BiPAP	35-100% FiO <sub>2</sub>
Endotracheal Intubation	35-100% FiO <sub>2</sub>



# PEEP





# PEEP IS AVAILABLE TO ALL

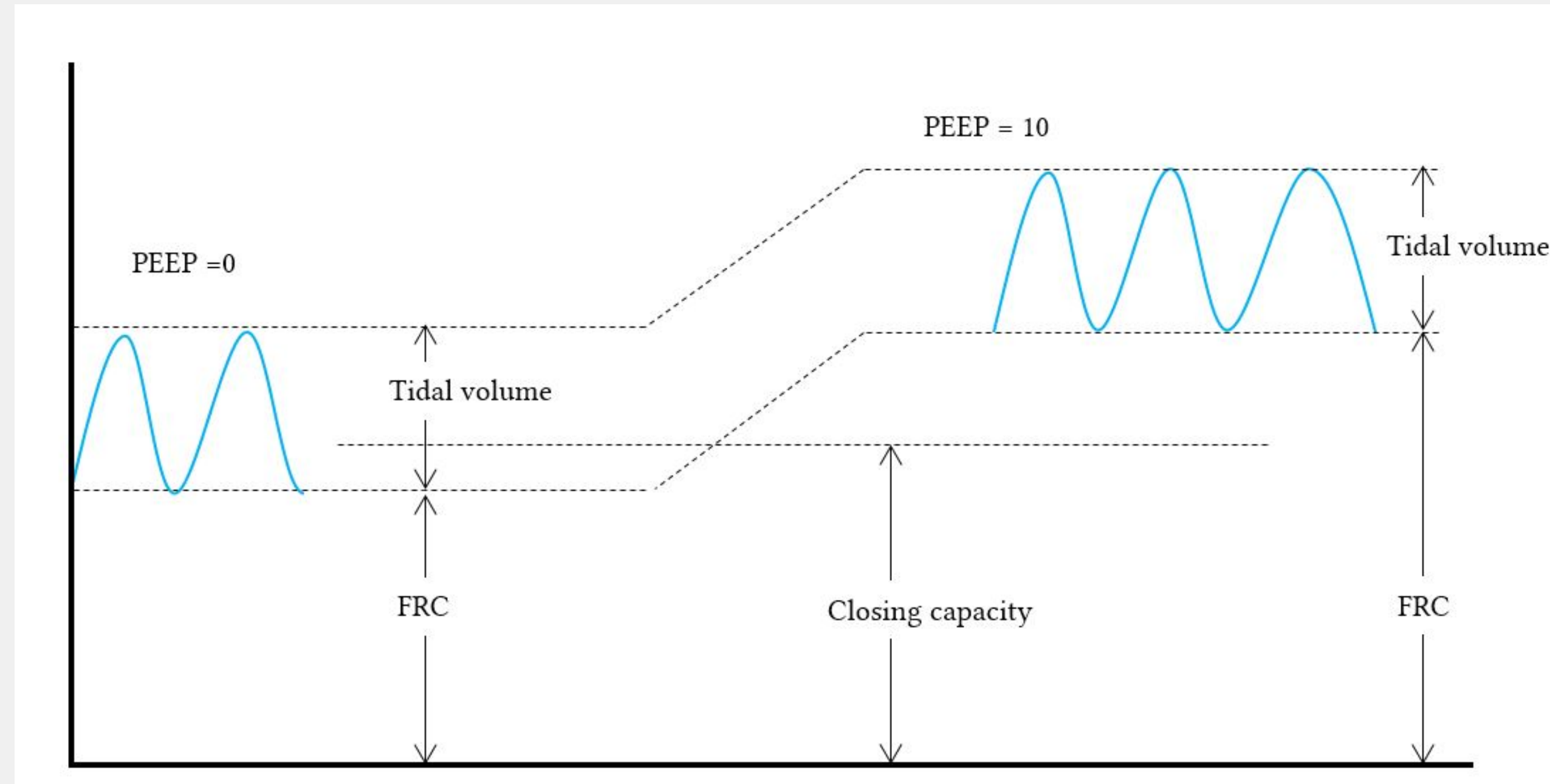
BVM with

- PEEP
- HEPA FILTER
- PRESSURE MANOMETER
- POP OFF VALVE
- ADULT & CHILD MASKS





# CO<sub>2</sub>: Tidal Volume or Rate



- **TV** - coaching, BVM, CPAP or Intubate (consider bronchodilators)
- **Rate** - coaching, BVM, intubate



# CPAP IS AVAILABLE FOR BLS





# THIS IS WHERE WE PAUSE





**WAY BACK WHEN I WAS A  
RESIDENT**





# BECOME THE MASTER OF THE BVM





# BECOME THE MASTER OF THE BVM

- Utilize TWO person/TWO handed seal when at all possible





# BECOME THE MASTER OF THE BVM

2 Handed Seal:

Good for Pediatrics

*AND* adults





# BECOME THE MASTER OF THE BVM

- Utilize TWO THUMBS UP!



Who has **TWO thumbs**  
and uses them on the **BVM?**





# BECOME THE MASTER OF THE BVM

- Pressures above 20 cm H<sub>2</sub>O increase gastric dissension



“Keep it in the  
**GREEN!**”





# KEEP IT SIMPLE

- Start with BLS airway measures
- Does patient need Oxygen or ETCO<sub>2</sub>?
- Consider non-invasive prehospital care CPAP/BVM assist?
  - Based on assessment adjust bagging/vent
- Intubate only when necessary vs SGA



# ***ER VS AMBULANCE***





# SO YOU NEED TO INTUBATE

- “Optimize” your patient
- “Oxygenate before you intubate” Build the patient’s reserve
  - NRBs suck
  - CPAP or High Flow NC (15 LPM+) w/ A BVM w/ PEEP
  - 3 min or 8 breaths
- “Resuscitate before you intubate”
  - Respect the shock index
  - Fluids
  - Push Dose Epi





# RESPECT THE SHOCK INDEX

RESPECT THE  
**SHOCK INDEX**

**= HR / SBP**

➔ **NORMAL SI = < 0.7**

➔ **SI > 1.0**  
Most specific predictor of  
**hyperlactemia & 28-day mortality**

➔ **A Pre-RSI SI > 0.8**  
Predicts **post-intubation crash** —  
resuscitate more first!

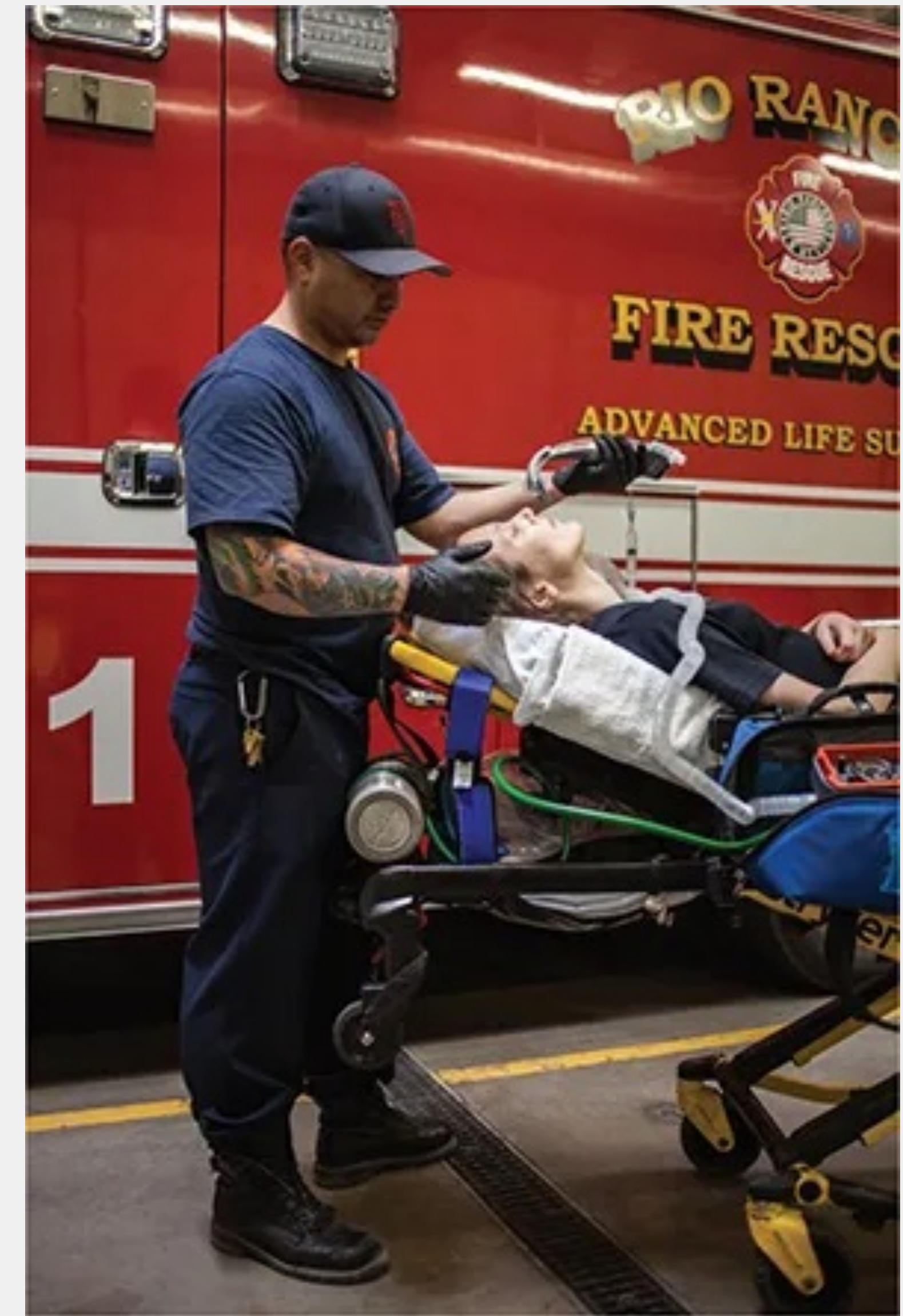
Pre-intubation SI **> 0.9**  
is an independent  
predictor of **cardiac**  
arrest during intubation.

Pre-intubation SI **> 0.9**  
is an independent  
predictor of **post-**  
intubation hypotension  
and collapse (arrest)



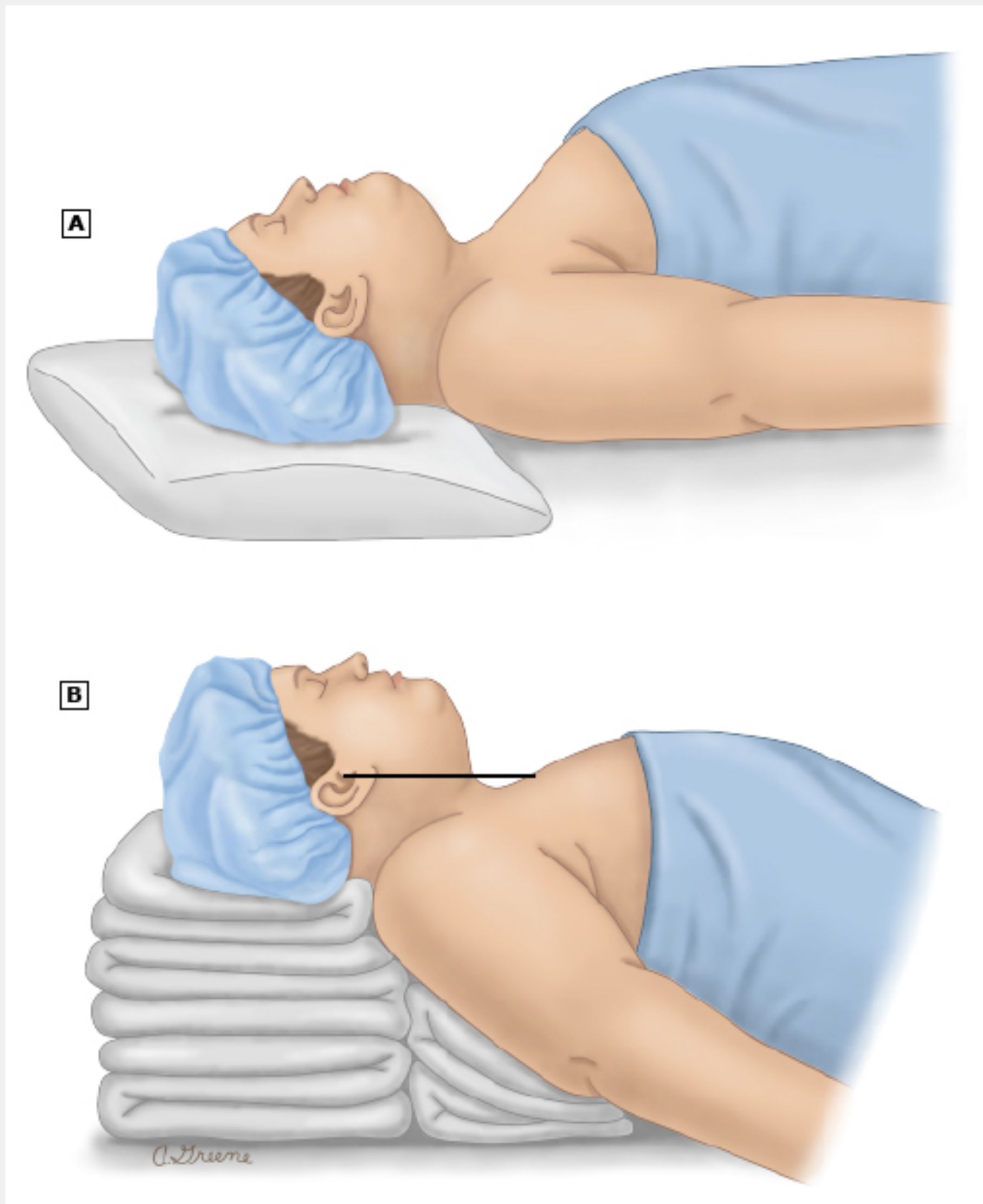
# SO YOU NEED TO INTUBATE

- Make it count; “Make your first attempt your best attempt”:
  - Bougie
  - VL
  - Position the head at the Navel (Move the patient if needed)
  - Elevate the trunk RAMP
  - “Ear to Sternal Notch”

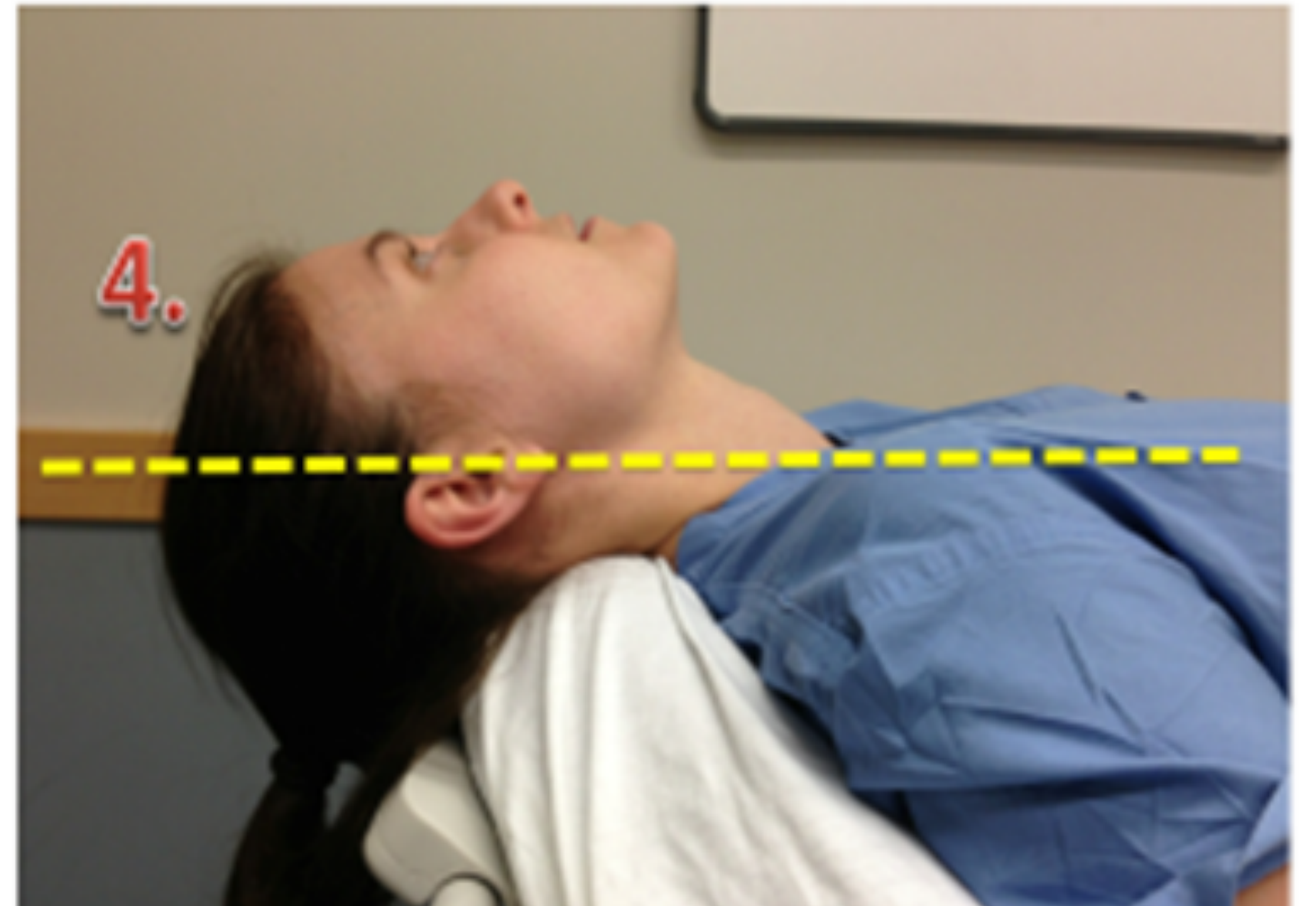




# PATIENT POSITIONING IS KEY



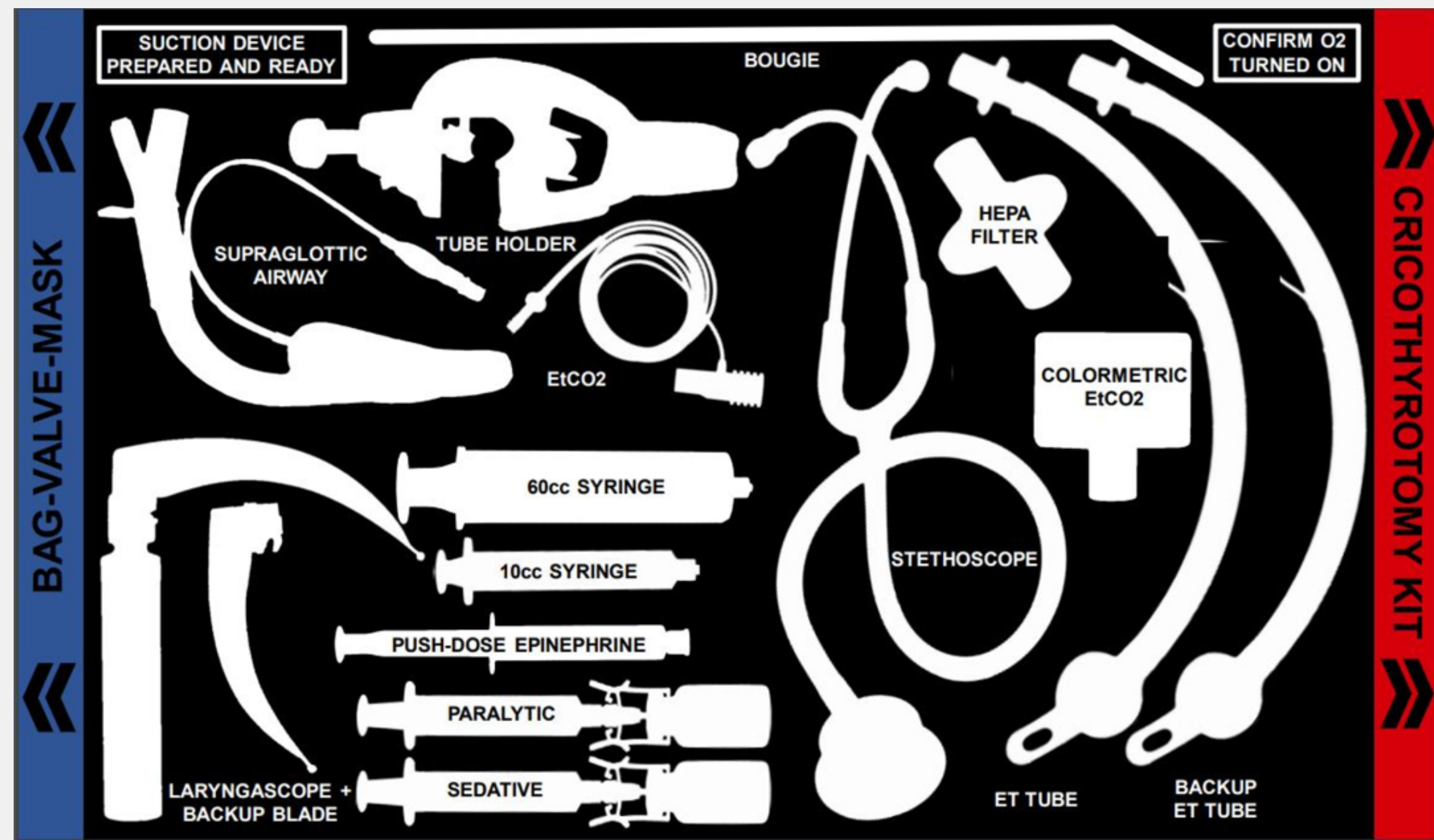
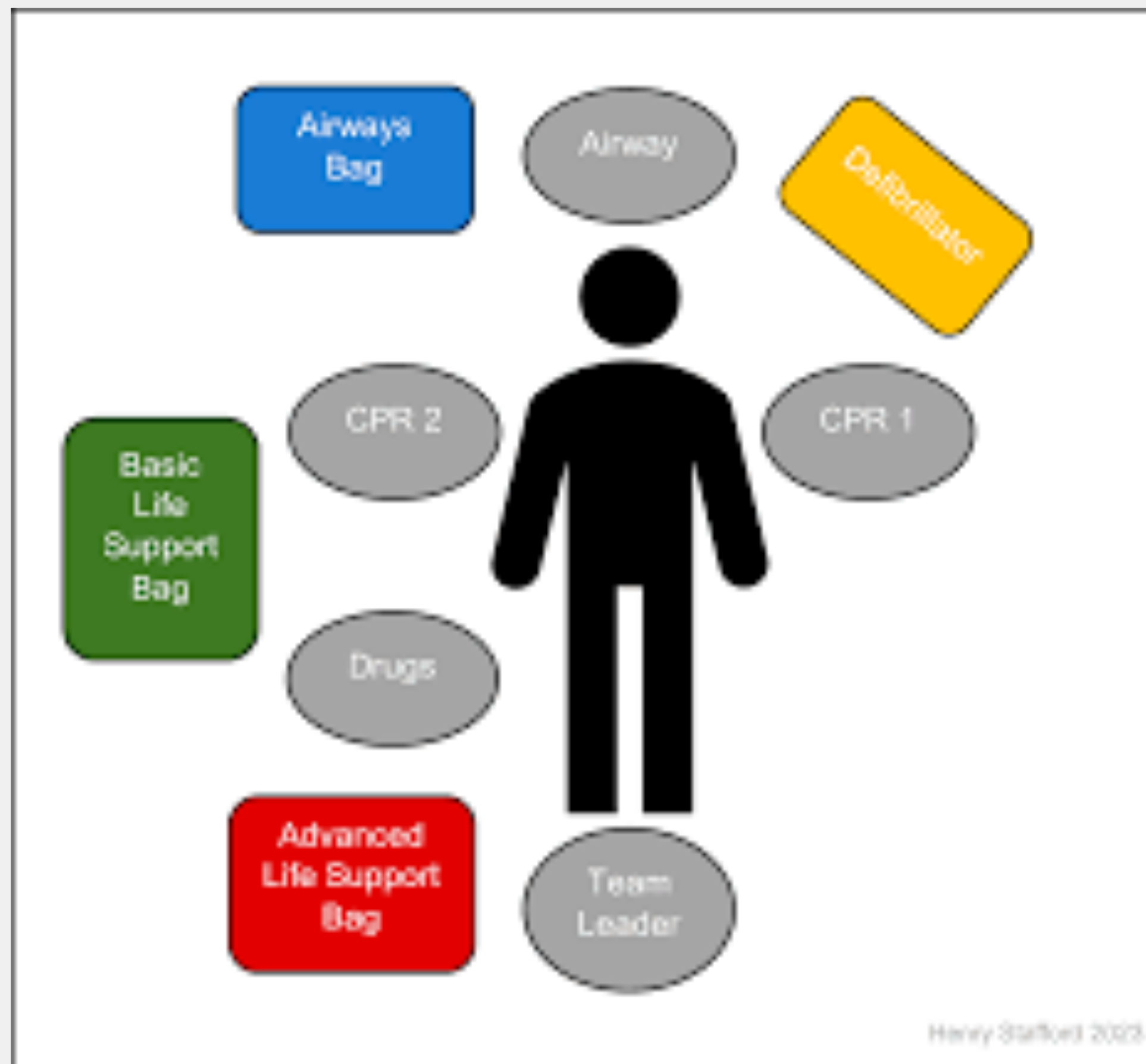






# IDEAS FOR SUCCESS

- Have a plan. Communicate the Plan.
- Assign providers to Roles





# Difficult Airway

## **Plan A:** Direct Laryngoscopy

Abort attempt if SPO2 falls below predetermined threshold  
Reoxygenate w/ 2 person BVM/OPA/NPA between attempts  
**Maximum 3 attempts**

Consider  
Alternate provider  
Alternate position  
Alternate blade  
Laryngeal manipulation

## **Plan B:** Supraglottic Airway

Airway Burns: direct to cricothyrotomy  
Place SGA  
Secure device, monitor w/ EtCO2  
Consider post intubation medication

## **Plan C:** Maintain Oxygenation

2 person BVM/OPA/NPA  
Allow return of ventilatory effort

## **Plan D:** Cricothyrotomy

Can't maintain oxygenation  
Can't intubate/Can't ventilate  
**Perform Emergent Cricothyrotomy**  
Do not delay! Commit!  
Secure device, monitor w/ EtCO2  
Consider post intubation medication

# “HAVE A PLAN”

The most important part: *Have a Plan, Train on the plan. Communicate the Plan.*

Plan A : Laryngoscopy. May Bypass

- 3 attempts MAX
- Pre-Ox/Re-Ox

Plan B: SGA

- May Bypass

Plan C: Bag Valve Mask Ventilation

- 2 person BVM with optimal adjuncts and position

Plan D: Cricothyrotomy

- Make a decision. Commit to cric



# ETT Confirmation

- EtCO<sub>2</sub>!!!!
- Misting only 69% false positive
- Lung Auscultation 14% false positive
- 5 Point Auscultation 18% false positive
- Esophageal Detector Device 5% false positive



# SUSTAINED WAVEFORM ETCO<sub>2</sub>: The New Standard

- “Sustained” ETCO<sub>2</sub> is defined as a **minimum of 7 consecutive breaths**.
  - The ETCO<sub>2</sub> is **consistent or increasing amplitude** of the capnogram **over 7 breaths**.
- The level of CO<sub>2</sub> rises and falls **appropriately with exhalation and inhalation**.
- The peak amplitude/change of CO<sub>2</sub> is a **minimum of 7.5 mm Hg above the baseline**.



# ***DON'T BE AFRAID TO FAIL/ CHANGE***

- **Anchor Bias:** a cognitive bias that causes us to rely heavily on the first piece of information we are given when making a decision or solving a problem. This leads to inaccurate final estimates due to inaccurate adjustments from an initial value





# DON'T BE AFRAID TO FAIL/ CHANGE





# CONFIRM CONFIRM CONFIRM

- Times to be scared

- Patient movements
- Loss of ETCO<sub>2</sub>!!!!!!
- Any change in condition
- When someone says “Man, they are getting hard to bag”
- When someone says “Oops”





# HOW TO VOICE CONCERNS

- You are a new provider, but you see something “amiss”.
- Are you afraid to bring it up to the “senior” paramedic or flight crew?
- Just “CUSS”

## CUSS

I am **C** ONCERNED!

I am **U** NCOMFORTABLE!

This is a **S** AFETY ISSUE!

*“Stop The Line”*

**S** TOP





# REINFORCE THE GOALS OF THIS LECTURE

- Discuss Airway Management and consider the underlying issue
- Situation dependent
- Look for least invasive means to solve the problem
- Master the BVM
- Plan ahead and trust your team
- Don't get tunnel visioned



QUESTIONS?

