



Patient Care Theory 2

UNIT 1, PART 3 ABCD review, Clinical Presentations

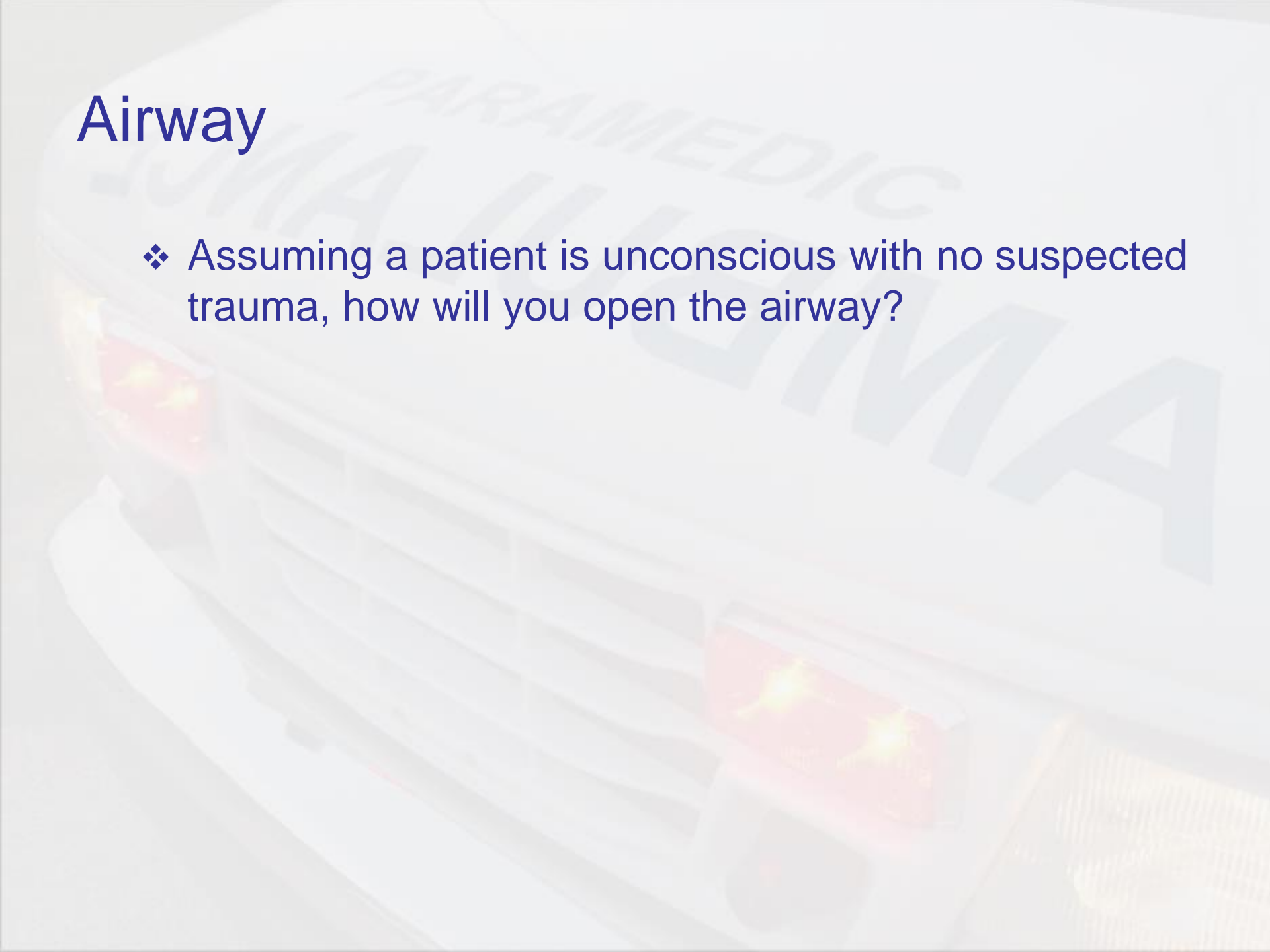
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Learning Objectives

- ❖ Discuss basic ABCD interventions
- ❖ Identify clinical drivers of ventilation and oxygenation
- ❖ Identify abnormal ventilation
 - Shunting
 - V/Q mismatch
 - Oxyhemoglobin dissociation curve
- ❖ Discuss Clinical presentations of acute/critical respiratory conditions

Airway

- ❖ Assuming a patient is unconscious with no suspected trauma, how will you open the airway?



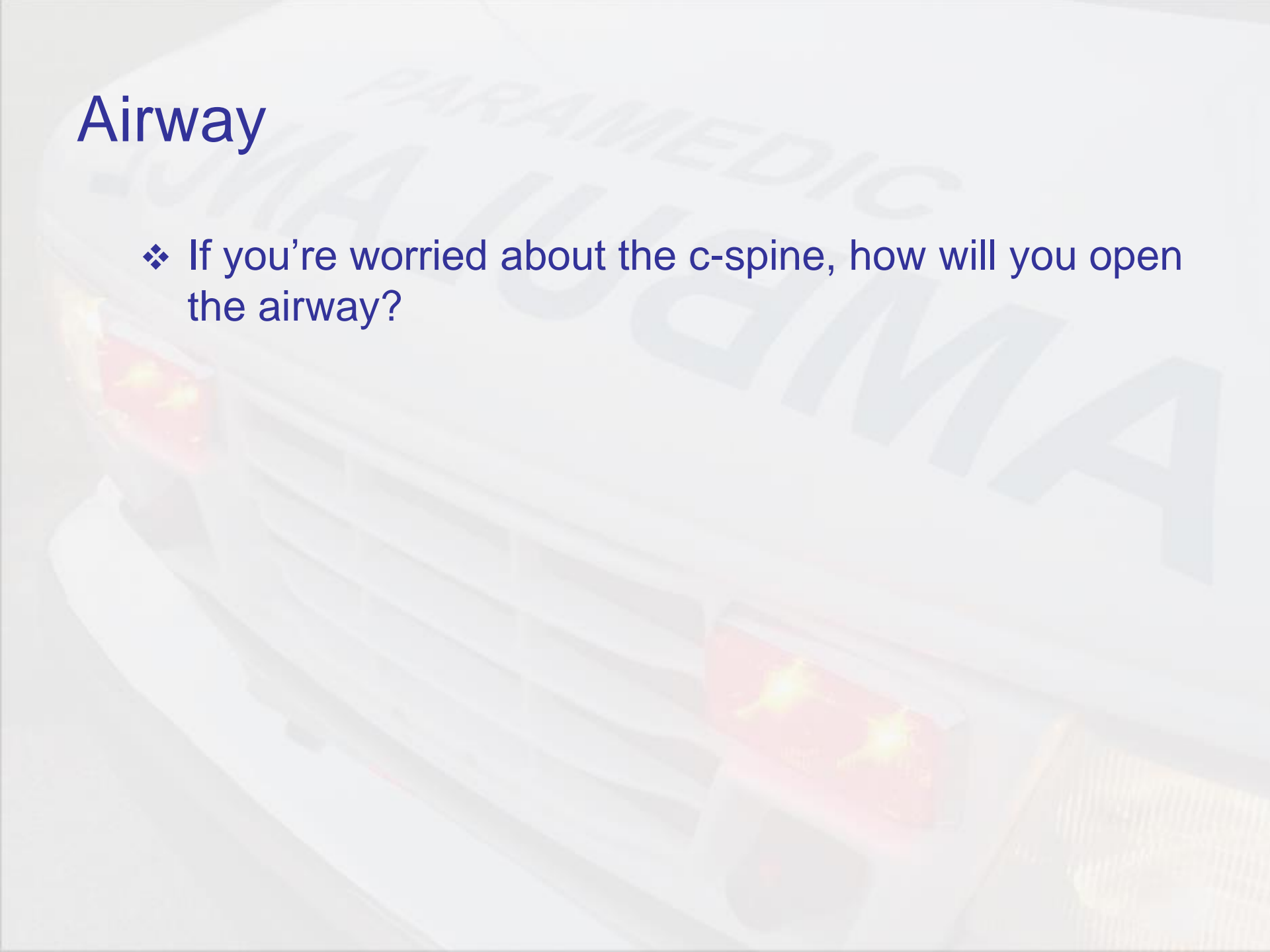
Primary Survey: A



Sniffing position: Neck flexed, head extended

Airway

- ❖ If you're worried about the c-spine, how will you open the airway?



Primary Survey: A

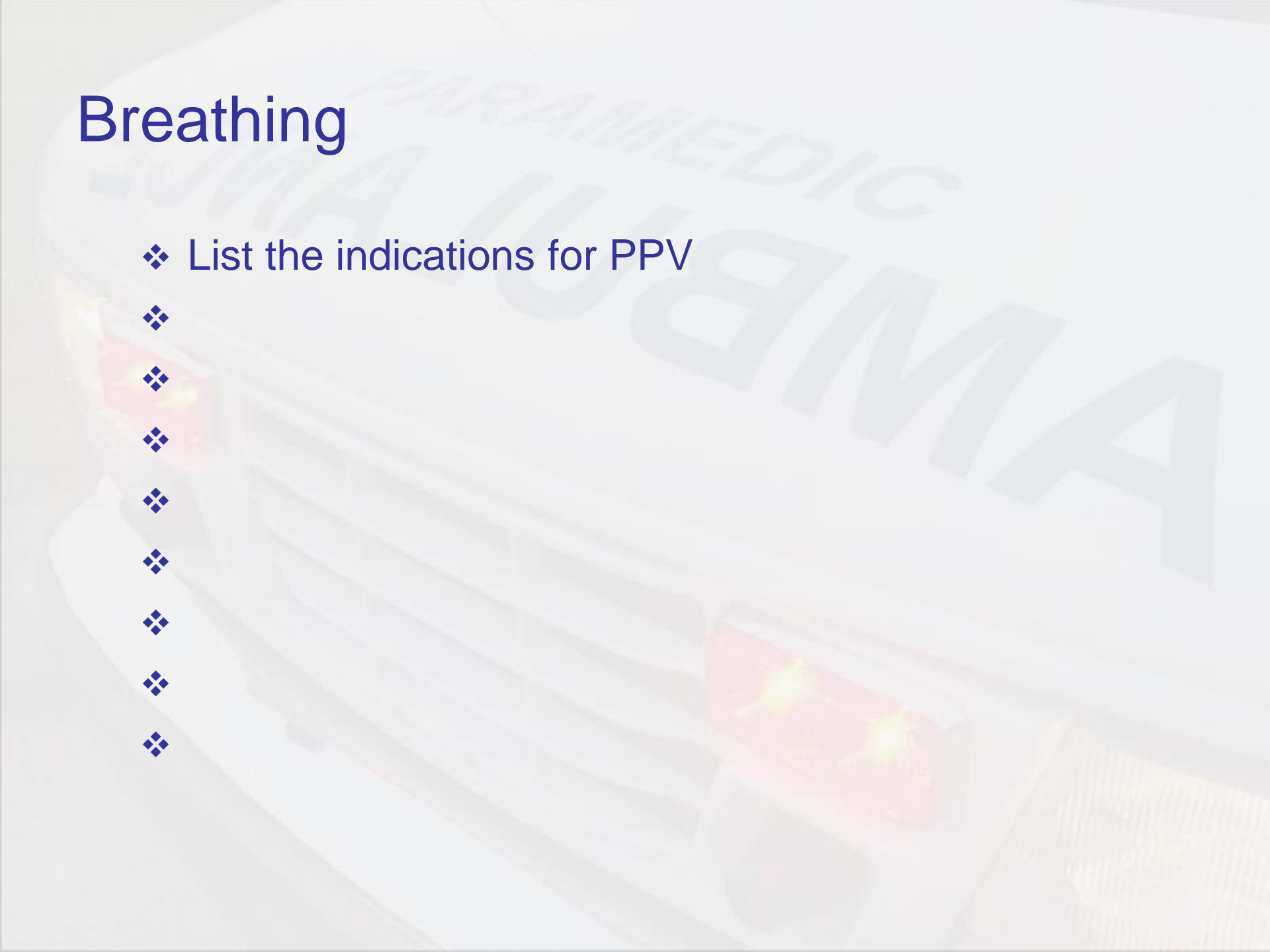
LOOK, LISTEN, FEEL – INTERVENE prn



Jaw Thrust

Breathing

❖ List the indications for PPV

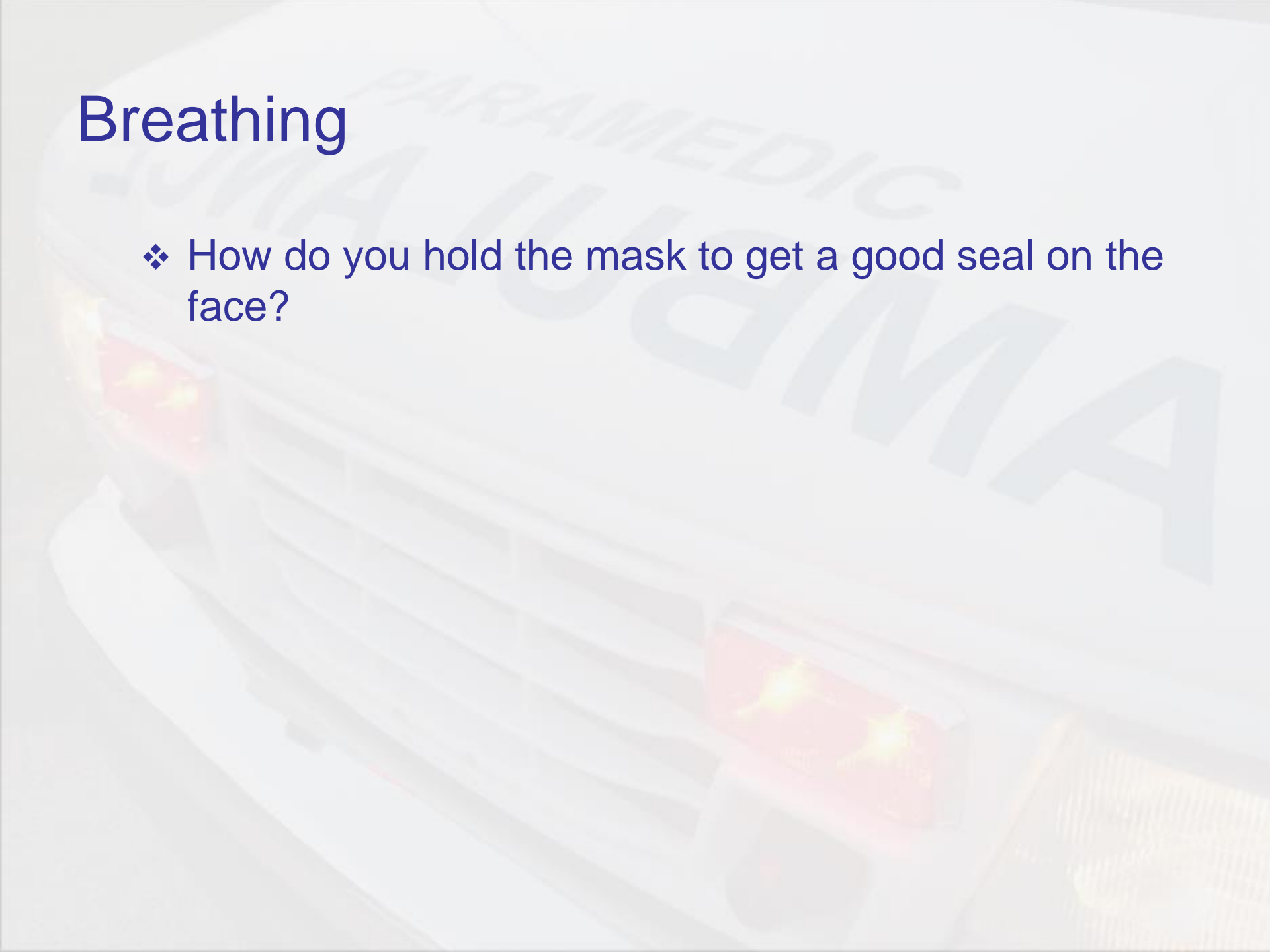


Ventilation

- ❖ One of the most important skills we do in EMS
 - Must be done correctly
- ❖ BVM – Bag-Valve-Mask ventilation
 - Understand the difference between artificial and assisted ventilations
 - When to hook up to O2 and how much
 - Pressure valve (infants and children -35-40 cm H2O)

Breathing

- ❖ How do you hold the mask to get a good seal on the face?





E-C clamp
technique (1
person)



2 – handed seal for 2 person technique
(best practice)

Evaluating Ventilations

- ❖ It is important that you are only squeezing the bag about 1/3 volume
- ❖ How do you know you are ventilating adequately?
 - Chest Rise
 - Improved patient condition
 - Improving vital signs (don't be fooled by decompensation)
 - Tools (ETCO₂)
- ❖ Often patients in the prehospital setting are ventilated too hard, too fast, and with too much volume. Why is this bad?
 - Barotrauma
 - Decreased venous return
 - Breath Stacking
 - Vomiting/aspiration

Define the following terms

- ❖ Tidal volume?

- ❖ Minute volume?

- ❖ Functional residual capacity (FRC)?

 - What is P.E.E.P.?

LUNG VOLUMES AND CAPACITIES

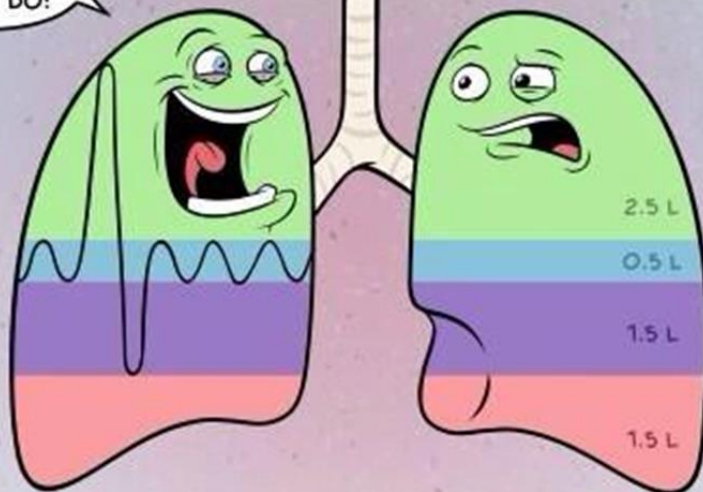
IRV
INSPIRATORY
RESERVE VOLUME

V_T
TIDAL VOLUME

ERV
EXPIRATORY
RESERVE VOLUME

RV
RESIDUAL VOLUME

LOOK WHAT
I CAN DO!



IC
INSPIRATORY
CAPACITY

FRC
FUNCTIONAL
RESIDUAL CAPACITY

VC
VITAL CAPACITY

TLC
TOTAL LUNG
CAPACITY



IRV



V_T



ERV



RV



IC



FRC



VC



TLC

Describe the following

❖ How oxygen is transported?

❖ What is the normal

- pH
- PaO₂
- PaCO₂

Define the following terms

- ❖ Lungs parenchyma?
- ❖ Pulmonary compliance?

Describe the following

Normal Values?

Indication for pulse oximetry?

Describe the following

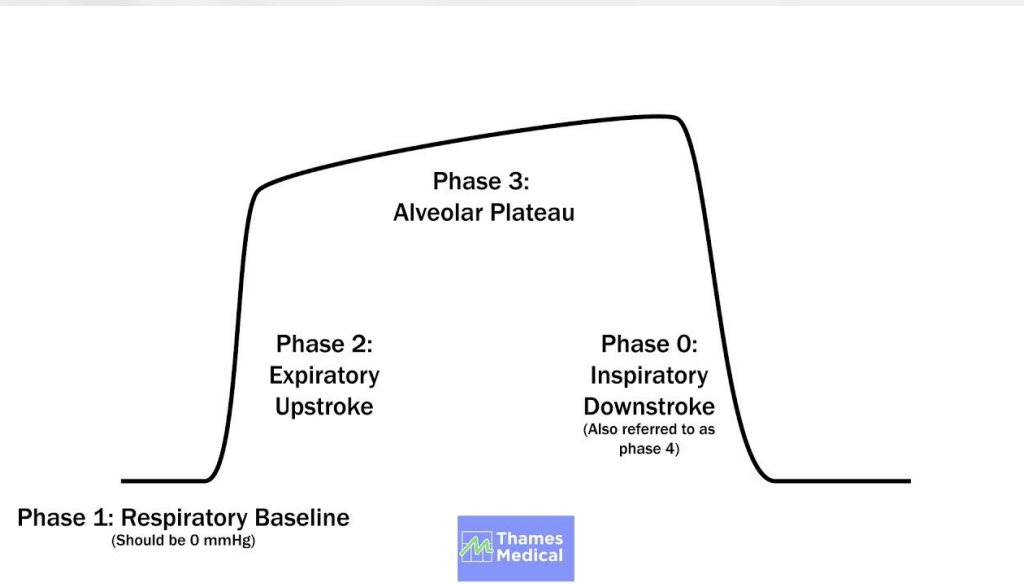
❖ Limitations of pulse oximetry?

ETCO2

❖ Evaluates how well respiration and in turn out ventilation is

➤ Normal values:

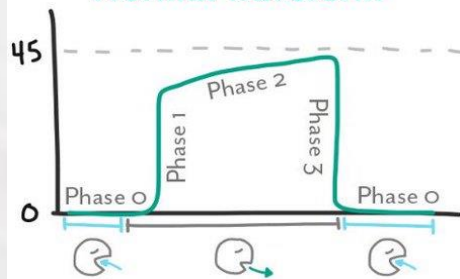
➤ Pleth:



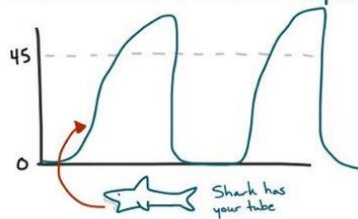
Capnography waveforms

Waveform Capnography

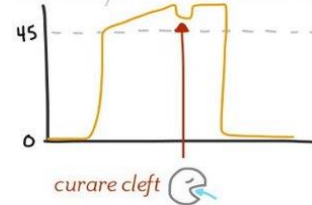
Normal waveform



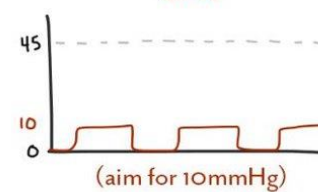
Obstruction / Bronchospasm



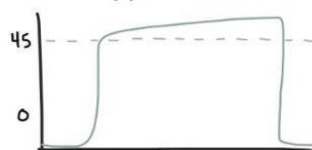
Asynchronous breathing
sketchymedicine.com



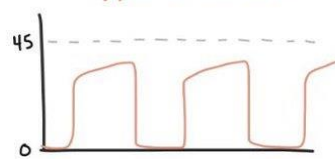
CPR



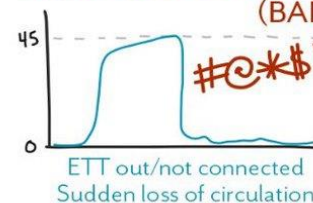
Hypoventilation



Hyperventilation



Sudden loss of waveform
(BAD!)





Let's talk clinical!

How would you....

- ❖ Describe how someone is having difficulty breathing?
 - i.e. what descriptors would you use in a report?

Asthma

- ❖ What is the pathophysiological triad of asthma
 - ***Chronic airway inflammation***
 - ***Bronchial hyperreactivity***
 - ***Bronchospasm***
 - Excess mucous production

- ❖ What is the classic clinical “triad” of asthma
 - **Dyspnea**
 - **Cough**
 - **Wheeze**

Bronchospasm

- ❖ List causes of bronchospasm
- ❖ What drug do you carry as a PCP for the treatment of bronchospasm?
- ❖ On what receptors does the drug work? What does it do?

Pulmonary Embolus

- ❖ Define?
- ❖ Describe? Etiology?
- ❖ Clinical presentation?

Pulmonary Embolus –Presentation

- ❖ ***Sudden onset pleuritic chest pain***
- ❖ ***Dyspnea*** (present in 90% of patients) typically increases with any exertion
- ❖ ***Tachypnea*** (present in > 90% of patients)
- ❖ ***Equal A/E***
- ❖ Cough/ Hemoptysis
- ❖ Splinting or guarding (pain)
- ❖ ***JVD***
- ❖ Localized wheezing/crackles
- ❖ diaphoresis
- ❖ Syncope
- ❖ Hypotension: 10% of patients present in shock

Pneumothorax

- ❖ Describe?
- ❖ Causes?
- ❖ Clinical presentation?

Pneumothorax

Presentation: **tension** pneumothorax

- ❖ Sudden pleuritic chest pain – localized to affected side
- ❖ Severe dyspnea and tachypnea
- ❖ ↓ ↓ ↓ unilateral A/E
- ❖ +/- SC emphysema
- ❖ Hypotension (likely)
- ❖ JVD
- ❖ Tracheal deviation +/-
- ❖ Cough – ruptured bleb (e.g. emphysema) often brought on by severe coughing

Bleb!



ARDS/ Acute Respiratory Distress Syndrome

- ❖ Pulmonary or systemic inflammation
 - Leads to damage of capillary and alveolar epithelium
 - Edema, fluids, proteins etc. flood the lungs
 - Disrupts surfactant the surface area for gas exchange
- ❖ V/Q mismatch, shunting, pulmonary hypertension
- ❖ Leads to hypoxia and poor perfusion

ARDS - causes

❖ Direct or indirect injury of the lungs

- Pneumonia
- Acid aspiration
- Drug overdoses
- Burns
- Inhalation injuries/exposures
- Lung contusion/trauma
- Drowning
- Embolism
- Sepsis
- Blood transfusions
- Etc.

Normal Vital Signs

Age	Respiratory Rate
0-6 months	30-60
6-12 months	25-45
1-3 years	20-30
~ 6 years	16-24
10+ years	14-20

Circulation

- ❖ Movement of blood

- The number of red blood cells
- The total volume
- The ability to deliver oxygen to the tissues and remove CO₂
 - Perfusion: the ability to pump or circulate oxygenated blood to the tissues
 - How do we measure this?

Normal Vital signs

Age	Heart rate
0-3 months	90-180
0-6 months	80-160
6-12 months	80-140
1-3 years	75-130
6 year	70-110
10 + years	60-90

Normotension – $SBP \geq 90\text{mmHg} + (2 \times \text{age in years})$

Hypotension – $SBP < 70 \text{ mmHg} + (2 \times \text{age in years})$

Trends

- ❖ Ongoing assessments = multiple sets of vital signs are used to detect changes in patient status
- ❖ Deteriorating patients do not always have “obvious” signs (i.e. hypotension and tachycardia)
- ❖ “Normal” is in the context of each individual patient

Cardiac Output = $HR \times SV$

Blood Pressure = $CO \times PVR$

What does this mean?

How will vital signs change to maintain this?

What about increased RR?

Normal Vital signs

- ❖ Is normal always stable?
- ❖ Effects of medications on vital signs
 - Important to acquire patient medication list for all call types
 - Pharmacology can affect the patient's ability to compensate
 - Can also mask symptoms and vital signs
 - i.e Beta blockers – HR can't increase
 - ACE inhibitors/ ARB's – RAAS ineffective

Summary

- ❖ A- requires patency
- ❖ B – ventilation
- ❖ C- perfusion
- ❖ D – Dependent on A, B, and C!



QUESTIONS?