

Medical Respiratory Emergencies

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What should we talk about?

- Why Respiratory Emergencies again?
- Pulmonary Physiology made simple
- The “in” pulmonary issues to have
- What the heck is that? (in-home equipment)
- Helpful things I wonder if you know?



Why Again?

- Respiratory Calls are some of the most common calls you will see.
- Respiratory Care and Airway is essential
- Mishandling a respiratory call can be fatal
- Because I **love** it!



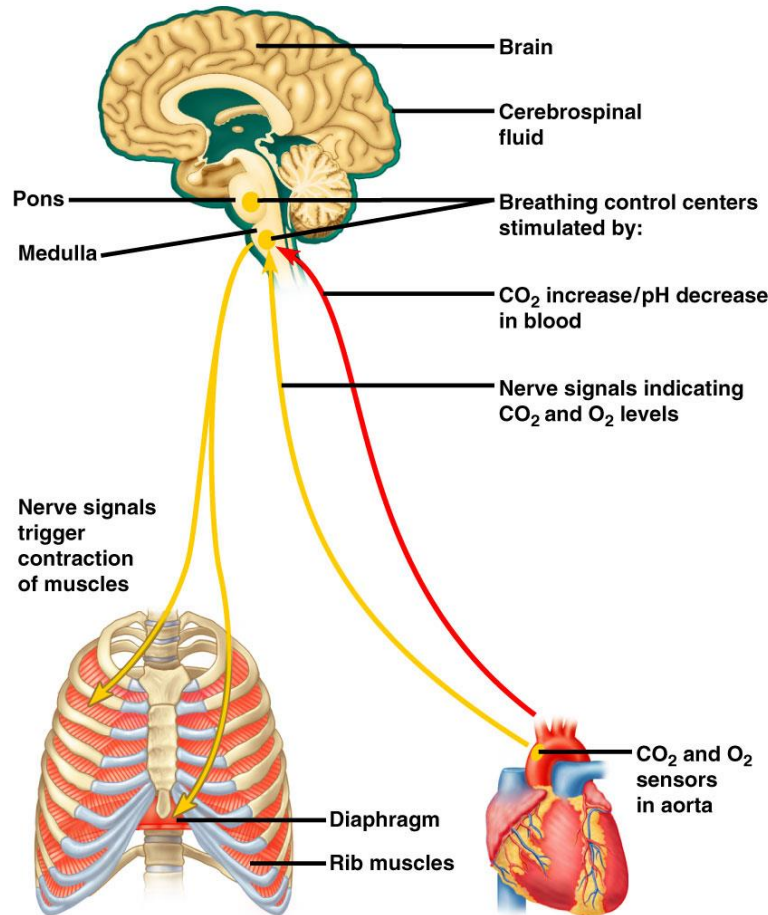
The Basics

Air Goes in and Out
Blood Goes Round and Round

Anything infringing on this is a **BAD THING!**

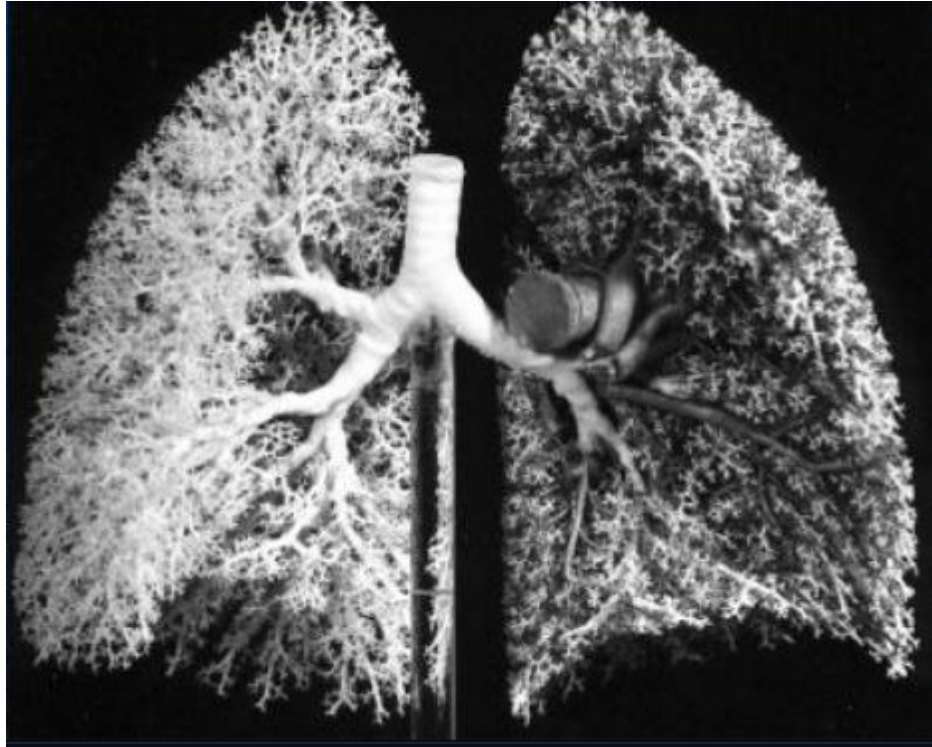


First Things First: The Brain



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The naked lung

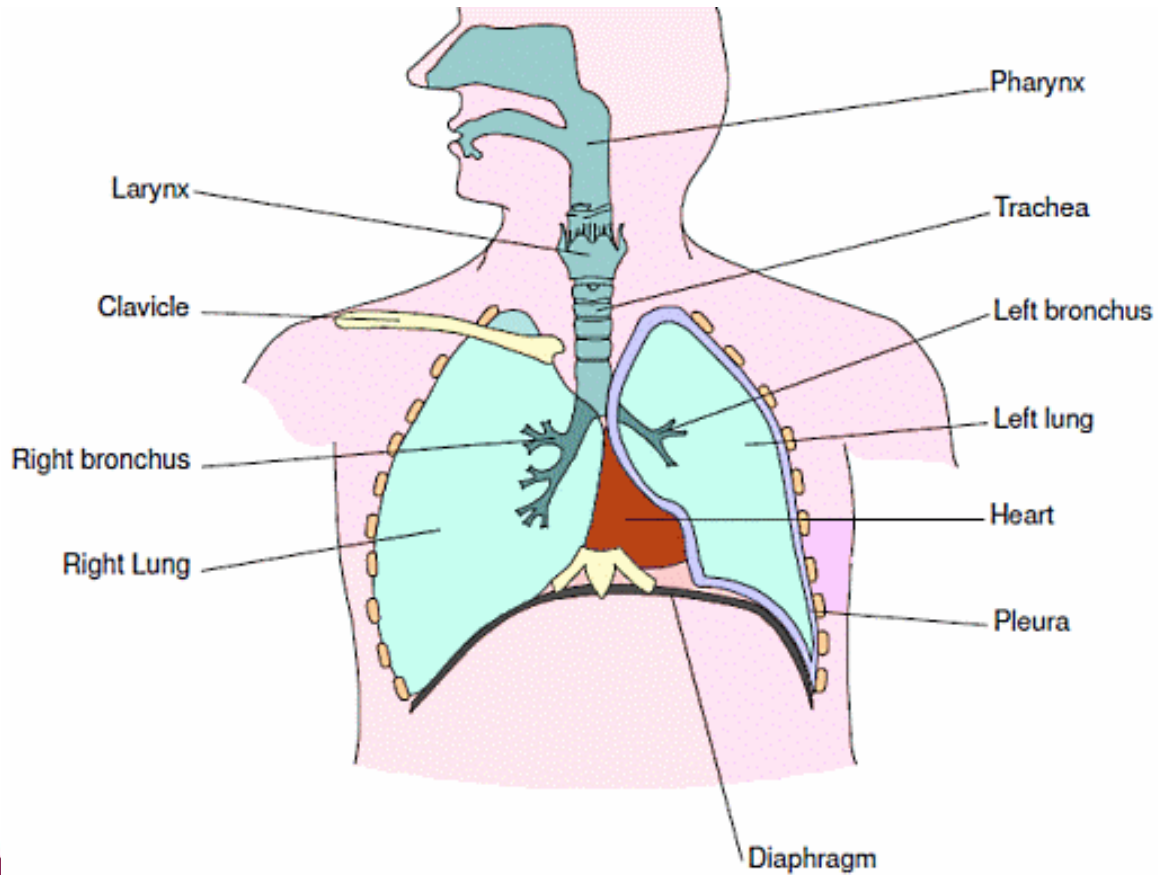


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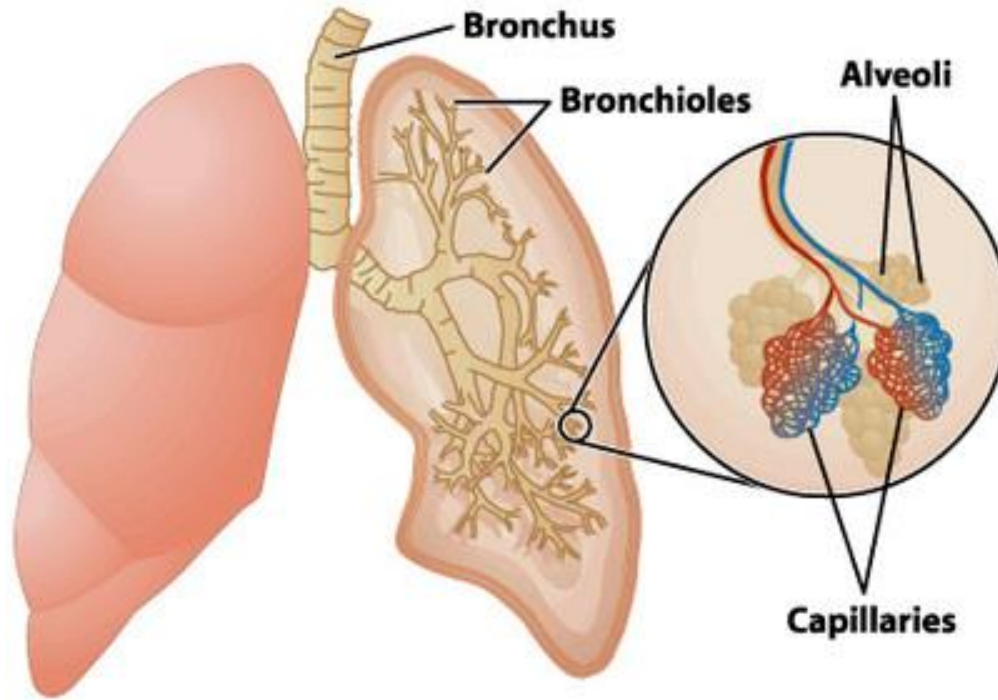

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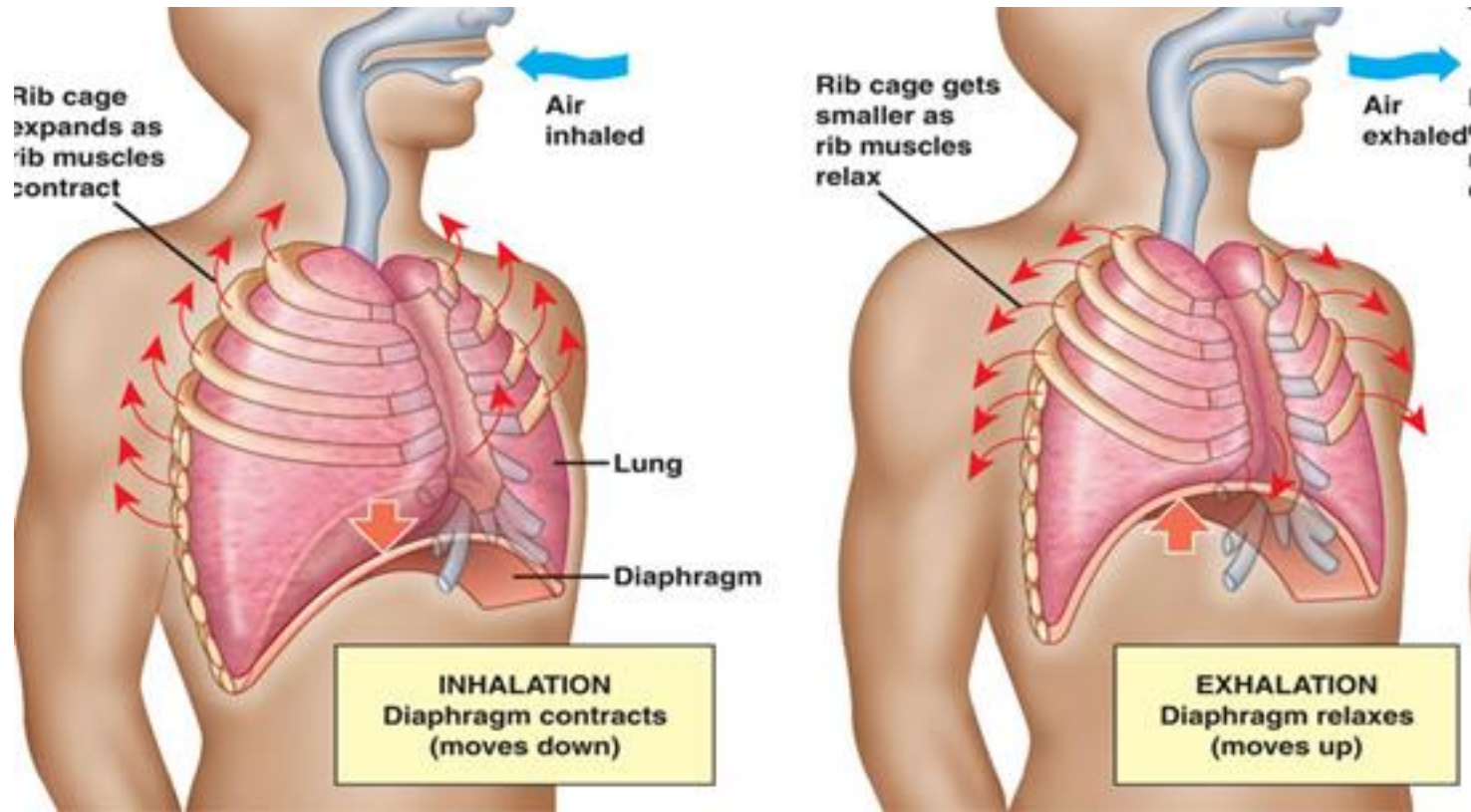
Basic Anatomy

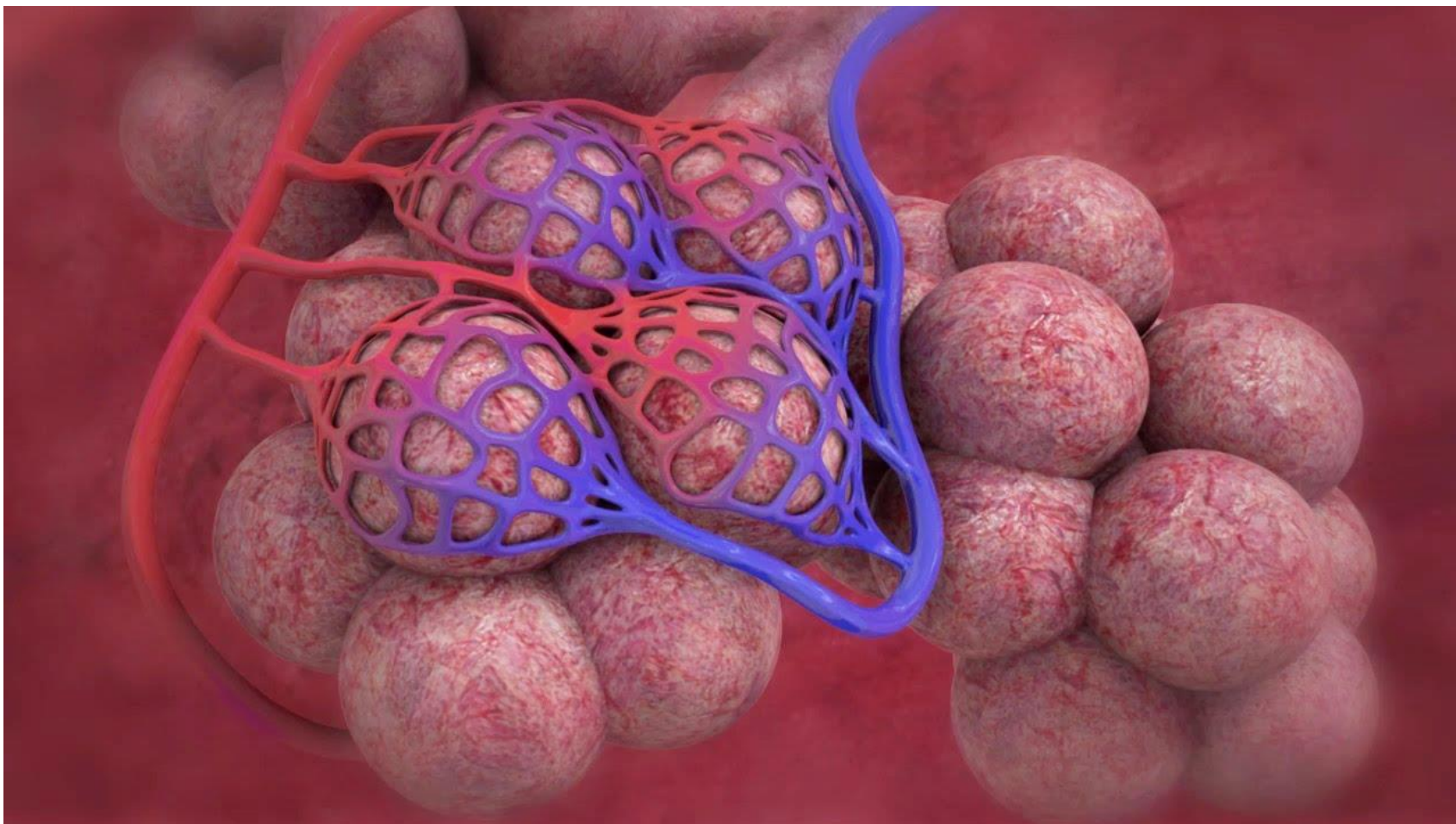


Basic Anatomy



Basic Physiology

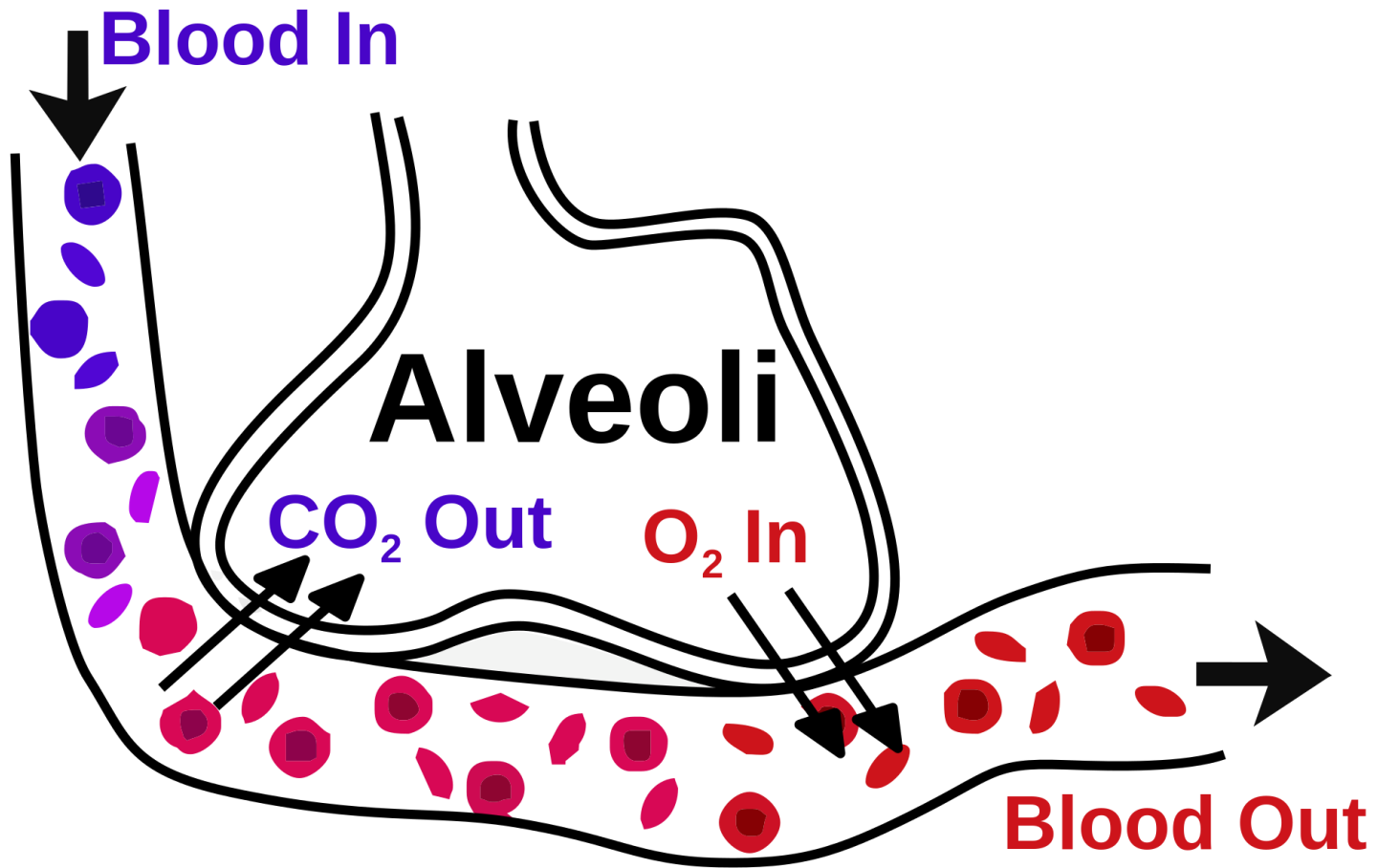




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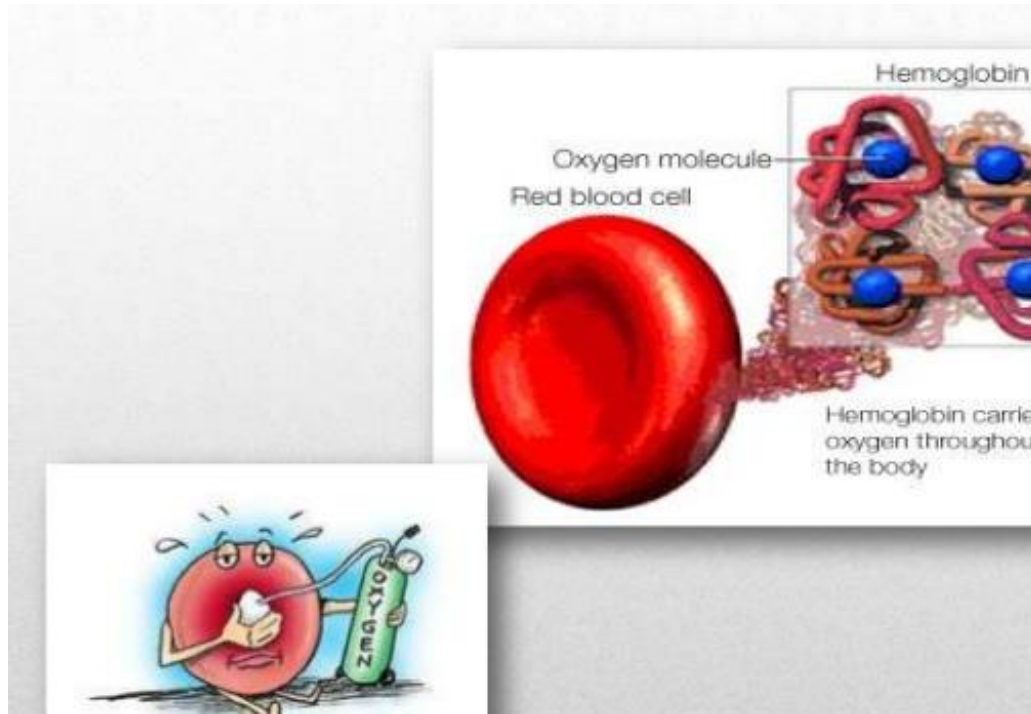


Key Concepts

- Primary function of the Respiratory System is gaseous exchange- **Ventilation** and **Oxygenation**
- Getting The Air in and Co2 Out- **Ventilation**
- Getting O2 into the blood across the capillaries- **Oxygenation**
- Respiratory Center of the Brain- **Pons and Medulla**
- **Chemo receptors** send signals to the brain



We Need Blood



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Key Components of an Intact Respiratory System

- An appropriate drive to breath- Brain and normal receptors
- Airway and respiratory tract
- Mechanical Bellows- Chest wall/diaphragm
- A diffusion friendly place for gas exchange to happen
- An O₂ friendly RBC with hgb
- An intact circulatory system to carry the gasses through out the body. With enough pressure to promote diffusion
- An intact capillary bed



Most Common Medical Conditions

- COPD – Emphysema and Chronic bronchitis
- Asthma
- Pulmonary Edema
- Pneumonia
- Hyperventilation



COPD








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COPD

CHRONIC BRONCHITIS	EMPHYSEMA
CLINICAL DIAGNOSIS: DAILY PRODUCTIVE COUGH FOR THREE MONTHS OR MORE, IN AT LEAST TWO CONSECUTIVE YEARS	PATHOLOGIC DIAGNOSIS: PERMANENT ENLARGEMENT AND DESTRUCTION OF AIRSPACES DISTAL TO THE TERMINAL BRONCHIOLE
OVERWEIGHT AND CYANOTIC	OLDER AND THIN
	
ELEVATED HEMOGLOBIN	SEVERE DYSPNEA
	
	X-RAY: HYPERINFLATION WITH FLATTENED DIAPHRAGMS
PERIPHERAL EDEMA	QUIET CHEST
RHONCHI AND WHEEZING	

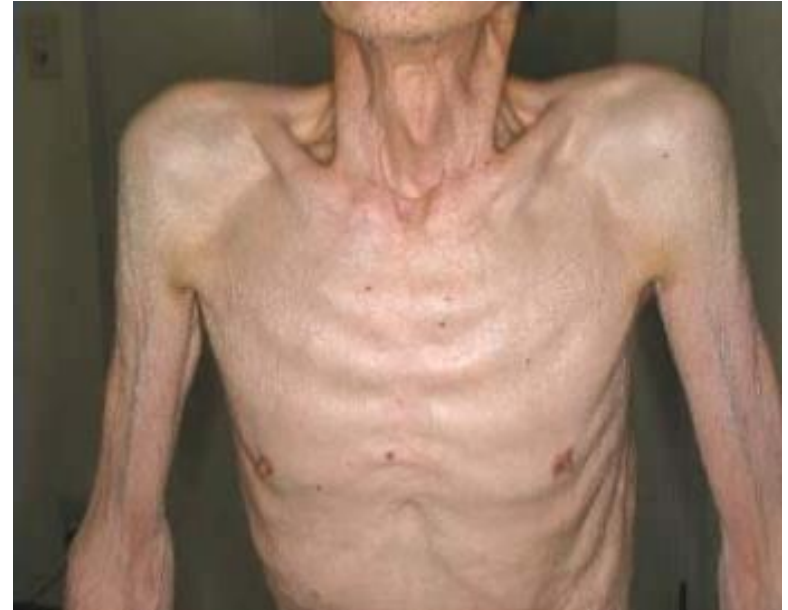
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Emphysema

- “pink puffer”
- “air trapping”
- Air goes in not out
- Destruction of alveoli and loss of elasticity
- Barrel chest
- Use of accessory muscles
- Quiet chest or exp wheezing
- Prolonged forced expiratory phase



What are the Compromised Components?

- Blunted Chemo receptors- **Brain and drive**
- Chest wall function – **Ventilation**
- Destroyed alveolus – **Oxygenation**
- During exacerbation can bronchospasm-
Ventilation



Chronic Bronchitis

- “Blue Bloater”
- Can be overweight
- Chronic productive cough
- Cyanosis
- Bronchial edema/spasm
- Wheezing/Rhonchi



What are the Compromised Components?

- Swollen and Spasmodic airways – **Ventilation**
- Abundance of Mucus – **Ventilation** and **Oxygenation**



Asthma

- Reactive airway event
- I:E wheezes/Silent Chest
- Accessory muscle use
- Tachycardia/Tachypnea
- Exhaustion
- Dry or productive cough
- Difficult to get air in and out



What are the Compromised Components?

- Bronchospasm- **Ventilation**
- Airway swelling – **Ventilation**
- Air-trapping – **Ventilation**
- Mucus production – **Ventilation** and **Oxygenation**



Actions for COPD/Asthma

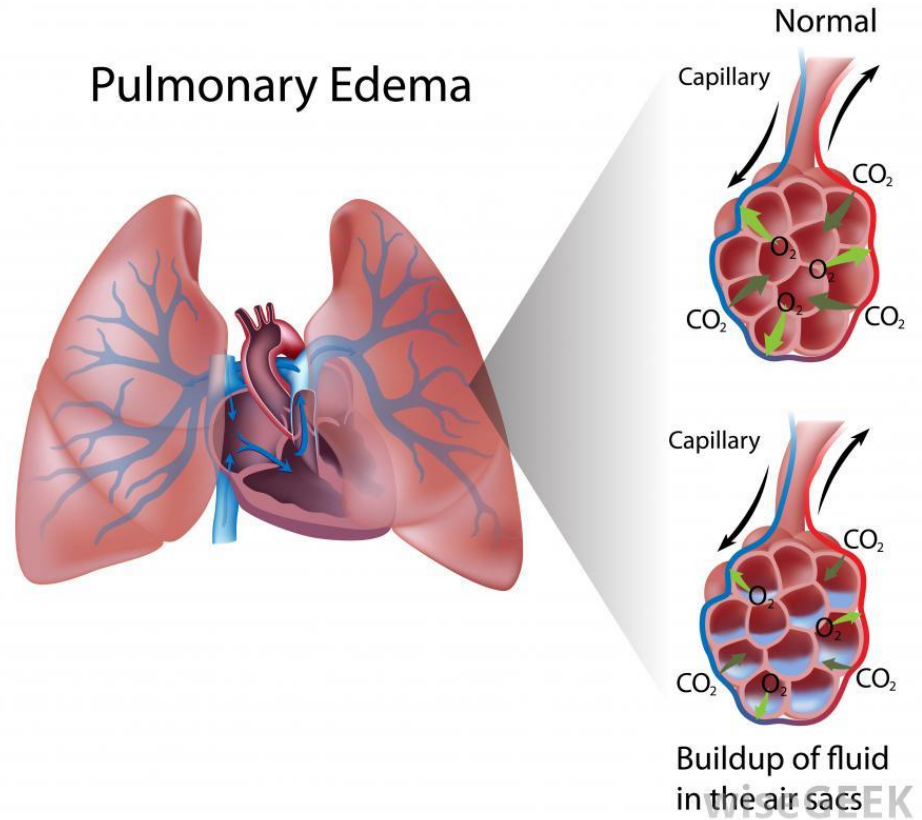
- Reassurance
- Respiration coaching
- Position of comfort
- Oxygen
- Administration of fast acting bronchodilators
(Give a bunch if needed)
- Insure adequate ventilation
- **Rapid Transport**



Pulmonary Edema

Causes

- Cardiac (CHF)
- Fluid Overload (Kidney)
- Non- Cardiac (Exposure)
- Sepsis (ARDS)
- Idiopathic (?)



Pulmonary Edema

- Wheezing/Crackles
- Dyspnea
- JVD
- Anxiety
- Orthopnea/nocturnal dyspnea
- Tachypnea/Tachycardia



Actions for Pulmonary Edema

- Reassure
- Position of comfort
- Oxygen
- Bronchodilators can help or hinder
- Positive Pressure (CPAP/BIPAP)
- Nitro
- Insure adequate ventilation
- Rapid Transport



What are the Compromised Components?

- Fluid filled alveoli – **Oxygenation**
- Bronchospasm due to reactive airways-
Ventilation



Bronchodilators

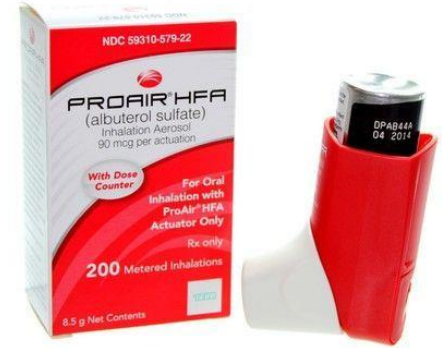
- Sympathomimetic
- Para sympatholytic
- Relaxes smooth muscle
- Common side effects: Increased HR, Nausea, Shaking



Albuterol

Promotes Bronchodilation

Sympathomimetic



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Ipratropium Bromide

“Atrovent”

Prevents Bronchoconstriction

Para sympatholytic



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Albuterol + Atrovent =



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Things I Have Noted

Pulmonary Edema Patients

- c/o “suffocation”
- Oxygen alone will often ease symptoms
- Nebulizer will Increase their WOB, increase anxiety and audible wheezes

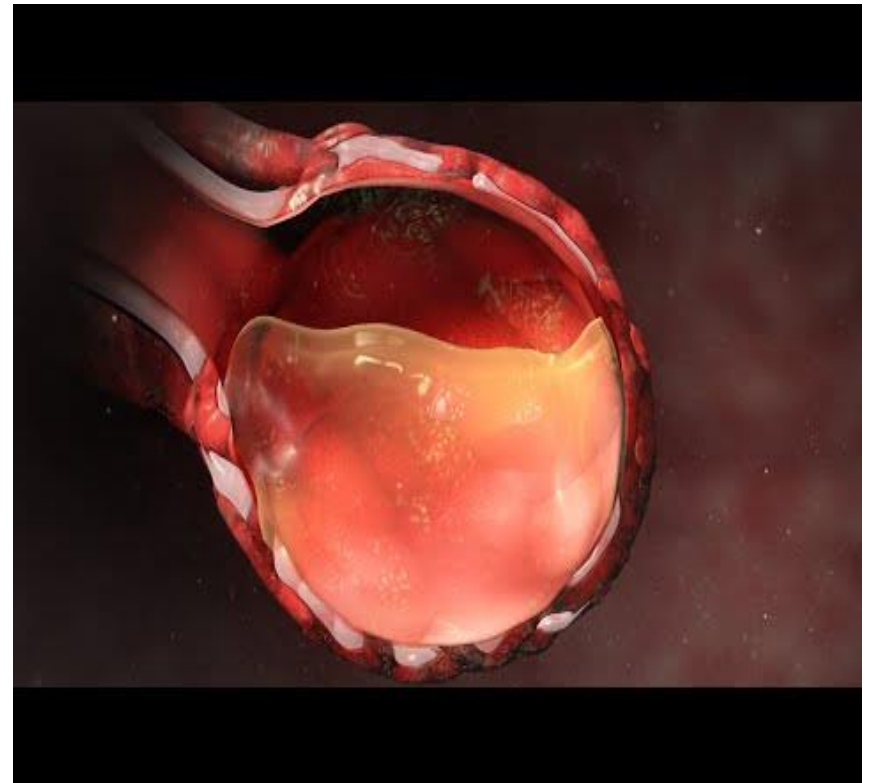
COPD/Asthma Patients

- c/o “tightness in my chest”
- Oxygen alone does NOT relieve symptoms



Pneumonia

- Look sick/dehydrated
- Illness ver several days
- Fever/Chills
- Rales/Rhonchi
- Productive/Nonproductive cough
- Dyspneic
- Low blood pressure
- Chest pain



Kinds of Pneumonia

- One or both lungs
- Caused by a Bacteria, Virus, Mycoplasma, or Fungus
- Hospital or Community acquired
- Ventilator acquired
- Aspiration
- Interstitial



What are the Compromised Components?

- Infection and/or inflammation somewhere in the lower respiratory system- **Ventilation** and **Oxygenation**



Actions for Pneumonia

- Oxygen
- IV fluids
- Assure adequate ventilation
- Rapid Transport



Hyperventilation

- Increased respiratory rate and depth
- Chest pain
- Tingling or numbness around mouth, hands and feet
- Muscle spasms



What are the Compromised Components?

- Decreased CO₂ due to rapid breathing -
Ventilation



Actions

- DO NOT use a paper bag
- Try to calm and reassure
- Remove the patient from the environment that may be causing the problem
- Transport if problem can not be resolved



Time To Bag!

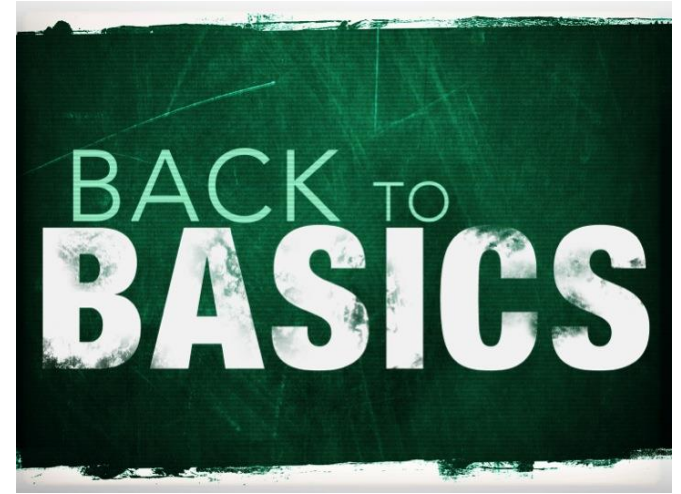
Ensure Adequate Ventilation

- SPO2 is NOT an indication of Ventilation
- Look at your patient
- Patients will maintain O2 saturations with compensatory mechanisms and be in respiratory failure (high CO2)
- Proper bag-valve-mask techniques can sustain adequate ventilation for extended periods of time



Time to BAG

- Position the head
- Use Oral Airway
- Jaw thrust
- Appropriate rate/Vt/I:E ratio
- View Chest rise
- Good Seal
- Try not to get distracted



What the Heck is That?

Concentrators



Nebulizer



Conservers



Home CPAPs



Any Doubt Throw it out

- Always switch to your equipment if the patients is in doubt
- Get your cannula, O2 tank, nebulizer, spacer, pulse oximeter probe, O2 mask



Things I Wish I knew When I Was an EMT-B

- Spacers (Soooo important)
- Nebulizers (Not all created equal)
- Aerosol masks (When to use)
- Blow-by nebulization
- Wheezing and Breath sounds



Deposition of Medication With and Without a Spacer



With out spacer

With spacer

Nebulizers

- Machines need routine cleaning, maintained, filter changes, and flow checks to ensure efficiency
- Hand held piece should be no longer than one month intervals
- Blow-by in a NO NO
- When to use an aerosol mask





All That Wheezes is Not Asthma and All
Asthma does not Wheeze



That's It What You Want To Talk About?

