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CEN REVIEW
RESPIRATORY
EMERGENCIES


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16 QUESTIONS **9.3%** 

ASPIRATION
ASTHMA
CHRONIC OBSTRUCTIVE PULMONARY DISEASE (COPD)
INFECTIONS
INHALATION INJURIES
ALI / ARDS
PLEURAL EFFUSION
PNEUMOTHORAX
PULMONARY EDEMA, NONCARDIAC
PULMONARY EMBOLUS
TRAUMA RIB FX, FLAIL CHEST, CHEST TUBES
ABG'S

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VENTILATION - PERFUSION - DIFFUSION 

How Does It Work	Medical / Traumatic Injuries
Hypothalamus	Leading to Problems
+	Increased ICP / Stroke
Phrenic Nerve	C5 to stay alive
+	T1-11- Intercostal Muscles
Diaphragm Contraction	T7-12- Abdominal Muscles
+	Diaphragm Injury
Intercostal Muscle Contraction	Abdominal Distention
+	Rib Fractures
Patent Airway	Open / Closed Pneumo
=	Obstructed Airway
Negative Pressure Ventilation	

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ASTHMA (REACTIVE AIRWAY DISEASE)



Signs / Symptoms


- Wheezing
- Prolonged Exp Phase
- Reactions
- Increased WOB
- Non Productive Cough
- PETCO₂ May be normal

ASTHMA SEVERITY	
Mild	Full Sentences Quiet Wheeze, Cough
Moderate	Few Words Persistent Cough, Loud Wheeze
Severe	Single Words Anxiety
Life Threatening	Unable to Speak, Cyanosis, Absent Breathe Sounds CPR / EXHALATION

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ASTHMA MEDS




Albuterol	B2 Agonist – Smooth Muscle relaxation
Ipratropium	Anticholinergic – For mucous
Corticosteroids	1-2 mg/kg/day- Possible 3-10 days Continue until patient achieves 80% Peak Flow
Terbutaline	B2 Agonist given PO or SC
Magnesium	Smooth Muscle Relaxer and Anti-inflammatory

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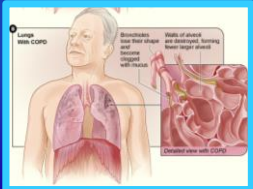
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CHRONIC OBSTRUCTIVE PULMONARY DISEASE




Causes

- Smoking
- Irritants
- Genetics



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CPAP / BIPAP 

CPAP - Continuous Positive Airway Pressure

BIPAP – Bilevel Positive Airway Pressure
IPAP / EPAP

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RESPIRATORY INFECTIONS 

Tuberculosis
Pertussis
Bronchiolitis
Croup
Epiglottitis
Pneumonia

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TUBERCULOSIS 

Pathogenesis
Classifications
 Primary
 Reactivating
Clinical Manifestations
DX and RX

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PERTUSSIS



Cause and Virility
Bordetella Pertussis
Highly contagious

Signs and Symptoms


Treatment
Erythromycin: Teens and Adults
Amoxicillin : Newborns



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BRONCHIOLITIS



Acute viral infection (RSV)
Contact Precautions
Symptoms generally worsen for the first 3-5 days


History of prematurity or cardiac/pulmonary diseases at greater risk for severe life-threatening illness

Rhinorrhea, Pharyngitis
Coughing/sneezing
Tachypnea
Retractions
Wheezing/prolonged expiratory phase
Apnea spells in young infants
Low-grade fever

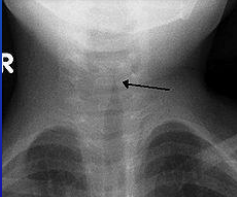
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CROUP




- UPPER RESPIRATORY DISORDER- COMMONLY VIRAL
- BARKY, SEAL-LIKE COUGH – WORSE AT NIGHT
- TREATMENT IS SYMPTOMATIC/SUPPORTIVE
 - COOL MIST/OXYGEN, AS INDICATED
 - CONSIDER CORTICOSTEROIDS
 - CONSIDER RACEMIC EPINEPHRINE (TYPICALLY 2 HOURS RELIEF)
 - CONCURRENT RESTING STRIDOR
 - OBSERVE FOR REBOUND EFFECT




STEEPLE SIGN

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EPIGLOTTITIS




- DROPLET PRECAUTIONS
- SYMPTOMS
 - ACUTELY HIGH FEVER
 - MUFFLED VOICE
 - SEVERE SORE THROAT — DIFFICULTY SWALLOWING
 - DROOLING
 - STRIDOR
- H. INFLUENZA TYPE B
- STREP PNEUMONIA
- STAPHYLOCOCCUS




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PNEUMONIA




0-50 Points:	Class I 0.1% Mortality
51-70 Points:	Class II 0.6% Mortality
71-90 Points:	Class III 0.9% Mortality
91-130 Points:	Class IV 9.3% Mortality
131-395 Points:	Class V 27.0% Mortality



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ACUTE INHALATION INJURIES




The airway and lungs receive exposure to irritant or toxic gas

Smoke CO / Cyanide	Upper Airway – Heat
Chlorine	Lower Airway – Toxins
Phosgene	
Amonia	Bronchoscopy
Sulfur Dioxide	PEEP
H+ Chloride / Sulfide	PaCO2 / PAO2
Nitrogen Dioxide	Many will develop Pneumonia

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ACUTE LUNG INJURY / ACUTE RESP DISTRESS SYNDROME 

Acute Onset
Diffuse bilateral infiltrates with Pulmonary Edema
No evidence of LV failure

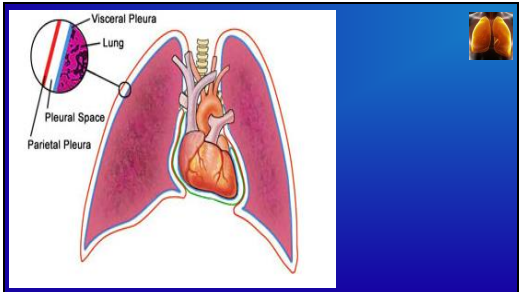
Hypoxemia-

$\text{PaO}_2/\text{FiO}_2 \leq 300 \text{ mmHg} = \text{ALI}$
 $\text{PaO}_2/\text{FiO}_2 \leq 200 \text{ mmHg} = \text{ARDS}$
regardless of the level of PEEP

Inflammation
V/Q mismatch
Respiratory Failure
SIRS
Mult. Organ Failure
GTSJ


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PLEURAL EFFUSIONS 


Transudate
Exudate

Pleuritic Chest Pain
E to A sounds
Decreased breath sounds
Dullness on Percussion
Asymmetry

CXR
CT
Thoracentesis

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PNEUMOTHORAX 

Primary	CLOSED
Secondary	OPEN
Traumatic	TENSION

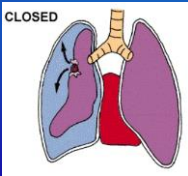
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PNEUMOTHORAX : CLOSED 


Air enters the pleural space
Pleural Pressure > Lung Pressure
Lung Collapses partially or complete

SMALL < 2cm between lung and chest wall
LARGE > 2cm between lung and chest wall

CLOSED 

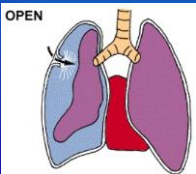
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PNEUMOTHORAX : OPEN 

3 sided occlusive dressing

Monitor for Tension
Pneumothorax

OPEN 

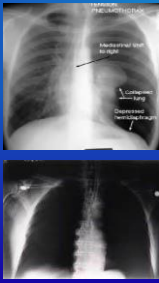
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PNEUMOTHORAX: TENSION

2nd intercostal Midclavicle
4th intercostal Midaxillary

Prepare for Chest Tube insertion




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PULMONARY EDEMA- NON CARDIAC

Fluid Leaks from the Capillaries to the Alveoli,
without backpressure from the heart

HAPE – O₂, Descend, Acetazolamide (Diamox), Nifedipine (Adalat)
CNS Conditions-
Adverse Drug Reaction-
PE
Viral Infections
Near Drowning / Dry Drowning



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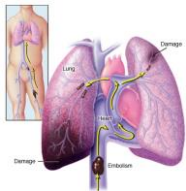
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PULMONARY EMBOLISM

Risk Factors
Hypercoagulation
Sedentary
Smoking
Cancers
Estrogen
Bed rest
Long Trips

Tachy x 2
CP / SOB
Fever
Cyanosis
Rales
Cough

Anticoagulation
Thrombolytics
Surgery
IVC Filters



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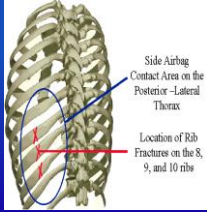
RIB FRACTURES

Ventilation, Perfusion, or Diffusion?

Concurrent injuries

Morbidity and Mortality

Treatment-
Pain Management,
Cough and Deep Breathe
Incentive Spirometer



Side Airbag
Contact Area on the
Posterior-Lateral
Thorax

Location of Rib
Fractures on the 8,
9, and 10 ribs


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FLAIL CHEST

Assessment findings:
Paradoxical movement
Ineffective ventilation
Dyspnea

Interventions
Prepare for Intubation
And Ventilation



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CHEST TUBES

Remove Fluid / Air
Restore negative Pressure

What output is significant?


Can I clamp it?



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PaCO₂		
<35	35-45	>45
Tends toward Alkalosis	Normal or Compensated	Tends towards acidosis
If Compensating Neutralizes low pH		If Compensating Neutralizes high pH



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Low pH Acidosis		High pH Alkalosis	
High CO₂	Low CO₂	High CO₂	Low CO₂
Respiratory	Metabolic	Metabolic	Respiratory



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Use HCO₃ to verify Metabolic Effect

First three steps cover most cases EXCEPT
Complete Compensation- Usually less serious
Combined Resp / Metabolic Cases- Pretty rare



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Acidosis		Alkalosis	
Respiratory	Metabolic	Metabolic	Respiratory
Lung Dis. OD Obesity Pulm Edema	MUDPILES Seizures Dehydration	Alkali Adm. Acid Loss Hypo K	Hypervent: Psych or Vent Pregnancy

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36 year old male patient being admitted with DKA. His vital signs include HR 105, Resp 28, BP 94/52, and a Temp of 37.1

Arterial Blood Gas		
pH	7.1	
PaCO2	28	
HCO3	18	
SaO2	99	Normal
Base Ex	-5	

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26 Year Old Female- G2 P1 admitted for a cellulitis. She is 36 weeks gestation
Vital Signs: HR- 96, RR 24, BP 98/64, Temp 38.3

Arterial Blood Gas		
pH	7.44	
PaCO2	30	
HCO3	20	
SaO2	95	
Base Ex	2	

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84 Year Old Female from an LTC Facility being admitted with a septic Pneumonia.
VS: HR 120, RR 28, BP 84/42, Temp 39.3



Arterial Blood Gas	
pH	7.12
PaCO2	60
HCO3	18
SaO2	74
Base Ex	-5

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An unrestrained driver presents to the emergency department following a crash. The nurse notes paradoxical respirations and suspects-



- A. Cardiac Contusion
- B. Pericardial Tamponade
- C. Flail Chest
- D. Pulmonary Contusion

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A patient with a history of chronic renal failure is brought to the emergency department with complaints of fever, productive cough and shortness of breath for the past two days. Which diagnostic study or intervention should be the priority for this patient?



- A. Steroid administration
- B. Antibiotic therapy
- C. Chest radiograph
- D. Blood culture and sensitivity

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Which of the following complications is of greatest concern for an intubated patient placed on a ventilator with positive end expiratory pressure (PEEP)



- A. Pneumothorax
- B. Airway Obstruction
- C. Atelectasis
- D. Pneumonia

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A patient with severe asthma required endotracheal intubation. Within several minutes of being connected to the ventilator, the patient's blood pressure drops to 70/40mm/HG, and pulse rate increases to 156 beats / minute. Breath sounds are equal. What should your first intervention be?



- A. Administer a 500mL Intravenous fluid bolus
- B. Disconnect the ETT from the ventilator
- C. Prepare for chest radiograph
- D. Prepare for chest tube insertion
