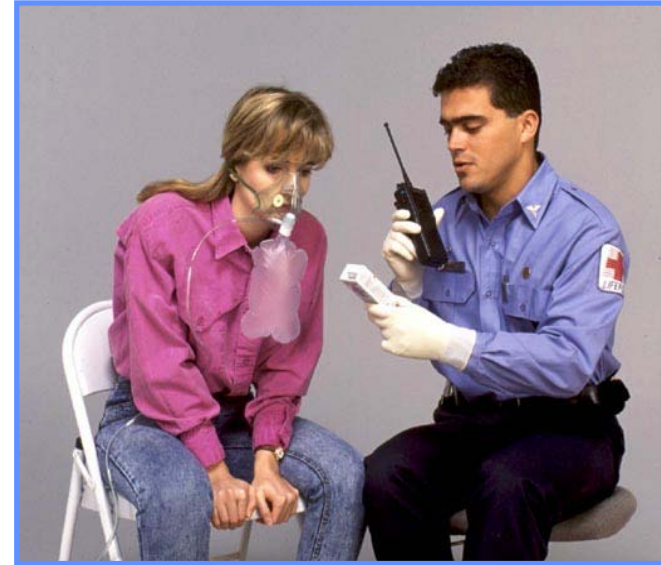


EMT Basic



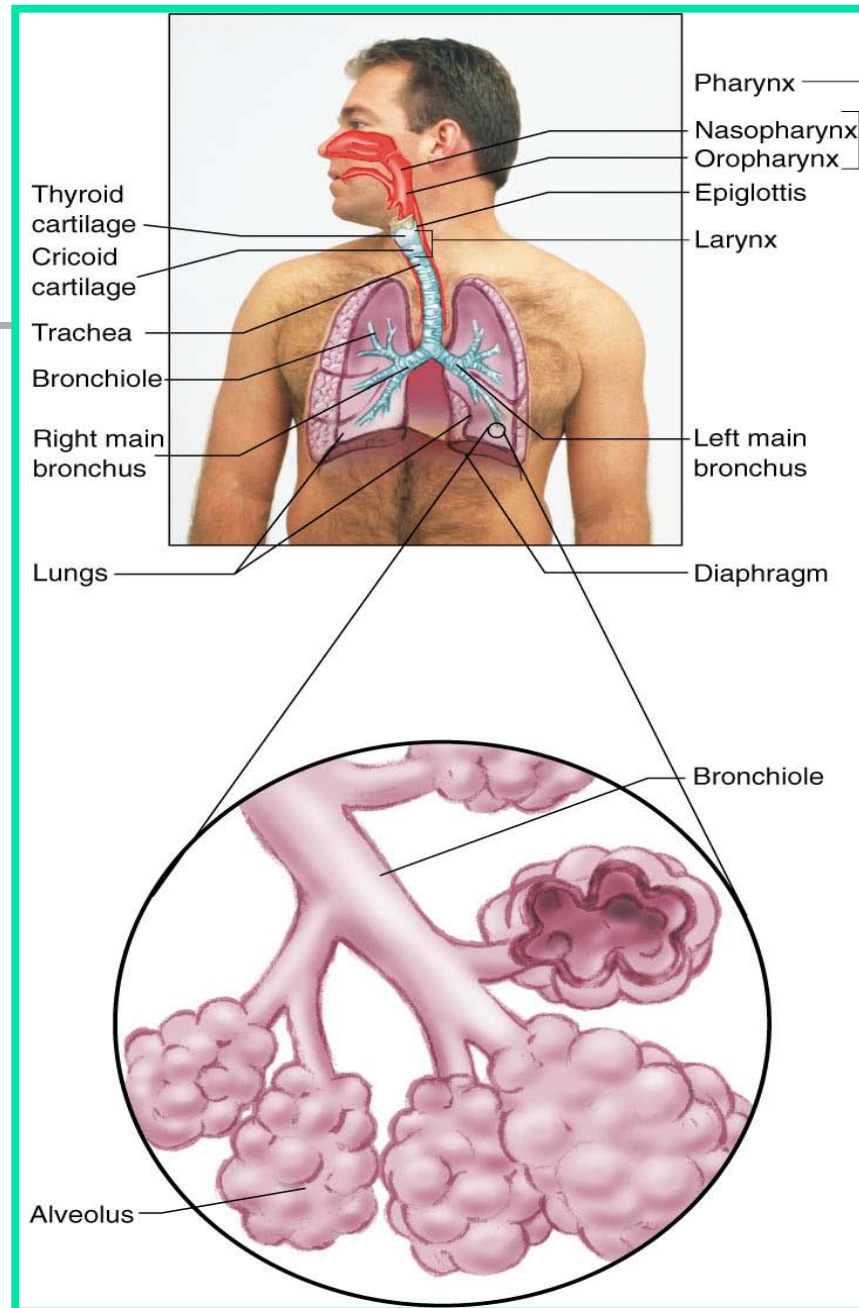
Respiratory Emergencies



Overview – We will Address:

- Respiratory Anatomy – adult vs pediatric.
- Respiratory Physiology – adult vs pediatric.
- Assessing respiratory status and breath sounds.
- Causes of dyspnea.
- S&S's of dyspnea.
- Managing respiratory emergencies.
- Use of oxygen.
- Nebulizer therapy and Multi-Dose inhalers (MDI).

The Respiratory System



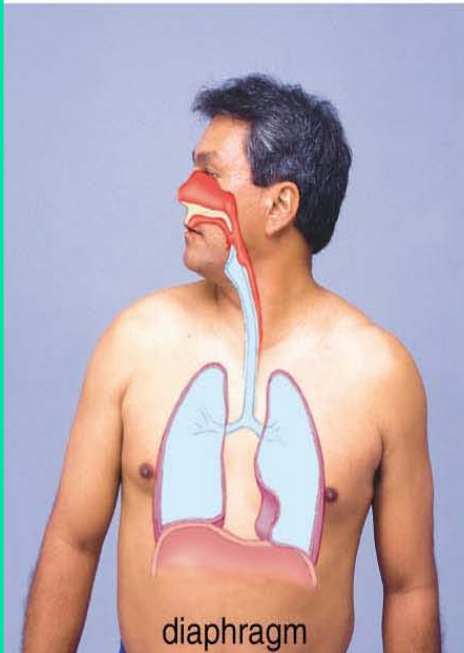


Airway Anatomy: Adult vs Pediatric

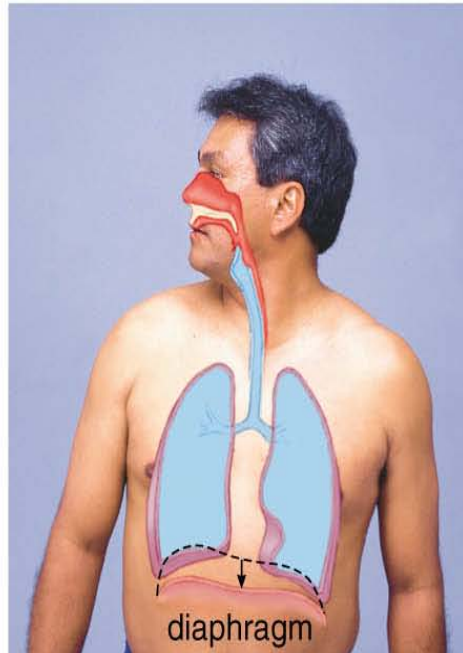
- Peds have a proportionately larger tongue.
- Peds have smaller air passages.
 - More easily obstructed.
 - More difficult to manage.
- Peds have a very “pliable” chest vs the adult.
- Peds have far less respiratory reserve when they develop problems – medical or traumatic.
- Death in the pediatric is often due to respiratory failure whereas the adult it is heart failure.

The Process of Respiration

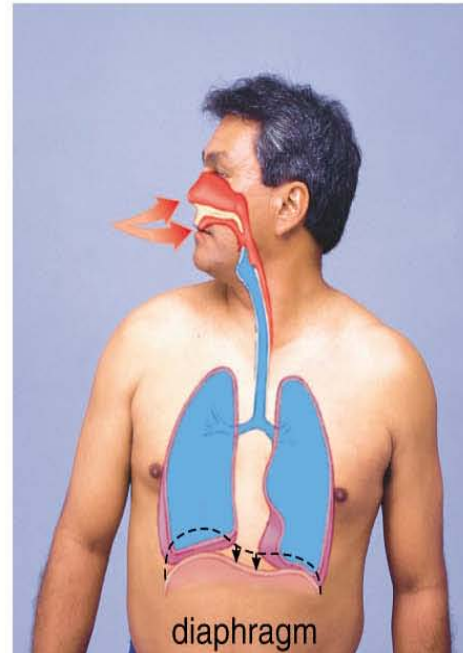
INSPIRATIONS AND EXPIRATIONS



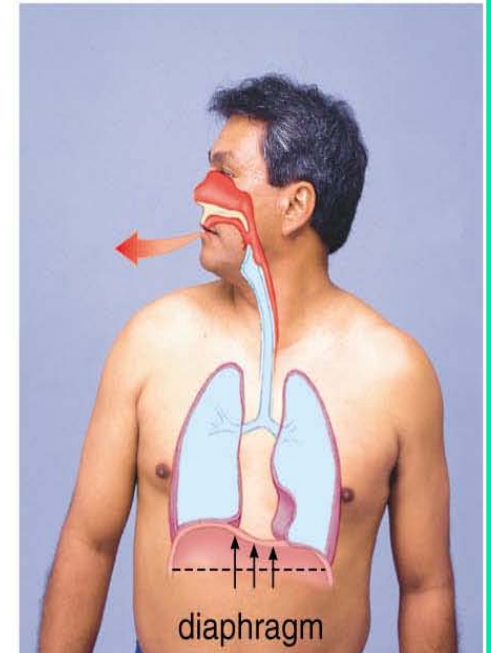
RELAXED



CONTRACTION
Inspiration begins



INSPIRATION



RELAXED
Passive expiration begins



Exchange of Gases: Alveolar / Capillary Bed

- The exchange is based on pressure changes at the alveolar capillary bed level.
- CO₂ and other waste products are forced out of the blood vessels into the alveolar sacs.
- O₂ leaves the alveolar sacs and enters the blood vessels to be returned to the heart for distribution.



Normal Respiratory Rates at Rest

- See your Protocol Manual chart:
 - Adults: 12 – 20 / minute.
 - Children: 15 – 30 / minute.
 - Infants: 25 – 50 / minute.
- These numbers may vary slightly from one reference to another.
- Children and infants often have slightly irregular respirations.



Assessing Respiratory Status

- Movement of air (tidal volume).
- Breath sounds.
- Effective chest movement.
- Respiratory effort.
- Oxygen saturation with pulse oximeter.



Signs of Inadequate Respirations / Distress.

- Inadequate air flow.
- Abnormal rates: too fast or too slow.
- Abnormal breath sounds - noisy.
- Excessive chest movement.
- Use of accessory muscles.
 - Especially with kids.
- Obvious dyspnea.
- Poor mentation and skin color.
- Tripod posturing (see picture later).



Assessing & Managing Respiratory Distress

- Evaluate:
 - AVPU.
 - **O**nset
 - **P**rovocation.
 - **Q**uality.
 - **R**adiation.
 - **S**everity.
 - **T**ime.
 - **S**AMPLE.
 - VS's.
- Treat:
 - Oxygen.



Basic Breath Sounds

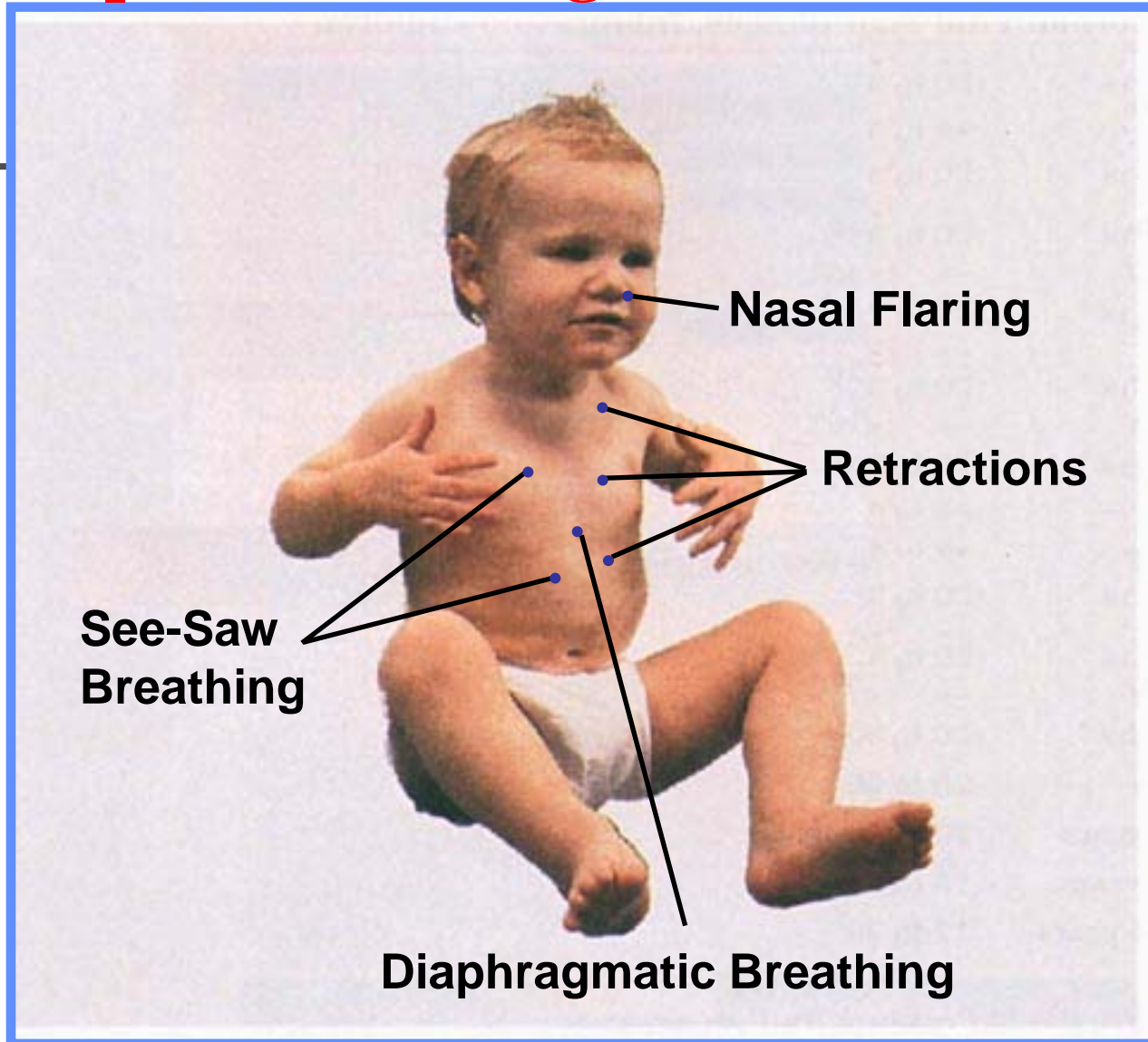
- Normal:
 - Clearly audible, adequate movement of air.
- Wheezing:
 - Sounds made by air moving through narrowed passages – whistling sounds like in asthma or sometimes pulmonary edema.
- Rales:
 - Fine, moist sound of air moving through moist small airways.
- Rhonchi:
 - Raspy, wet sounds of air moving through larger airways.
- Stridor:
 - High pitched sounds made by narrowing of upper airways.
- Diminished or Absent:
 - Reduced or absence of air movement through the airways.



How Do You Listen to Breath Sounds?

- Use the diaphragm of your stethoscope and listen to at least six (6) areas. BS's are best heard from the posterior chest while the patient takes deep breaths through their mouth.
 - Upper mid-scapular areas bilaterally.
 - Posterior / Mid-axillary areas bilaterally.
 - Lower rib cage, mid-axillary areas bilaterally.
 - Always compare at the same levels.
 - Always listen to a complete cycle – inhalation / exhalation.

Inadequate Breathing: Infants and Children





Artificial Ventilations: Controlled vs Assisted

- Who requires **Controlled** Ventilations?
 - Little or no spontaneous movement of air (agonal respirations) from the mouth or nose (or surgical airway).
 - Altered LOC.
- How do we accomplish this???
 - The Bag-valve Mask (BVM) with supplemental oxygen.
 - Works better with 2 – 3 rescuers.
 - 1 rescuer use of the BVM is very difficult – but can typically be done.
 - Requires much practice.



Artificial Ventilations: Controlled vs Assisted

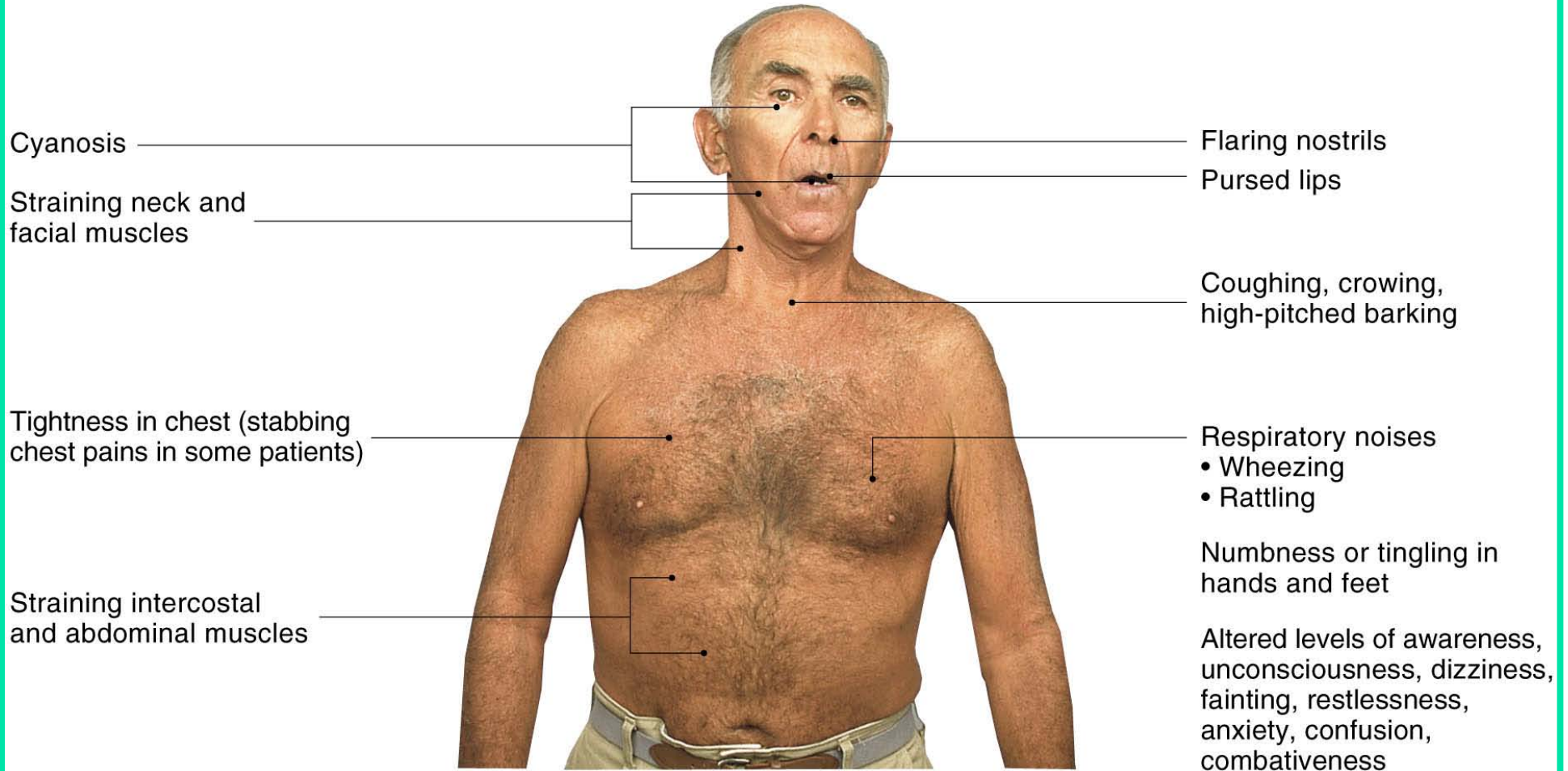
- Who requires **Assisted** Ventilations?
 - Respirations are too slow, too fast or air is not being moved in adequate volumes.
 - Patient is cyanotic, little chest movement, exhaustion...
 - Altered LOC.
- How do we accomplish this???
 - The Bag-valve Mask (BVM) with supplemental oxygen.
 - Work with the patient to coordinate use of the BVM with the patients spontaneous efforts. 10 – 12 / minute for the adult. Faster for those younger. **Very psychological.**



How Do We Know if Ventilations are Effective?

- Good chest rise.
- Improved LOC.
- Improved skin color.
- Improved oxygen saturations (pulse oximeter).
- General overall improvement or stabilization.
- VS's stabilize.
- Reduced anxiety.

Signs of Breathing Difficulty



Cyanosis

Straining neck and facial muscles

Tightness in chest (stabbing chest pains in some patients)

Straining intercostal and abdominal muscles

Flaring nostrils

Pursed lips

Coughing, crowing, high-pitched barking

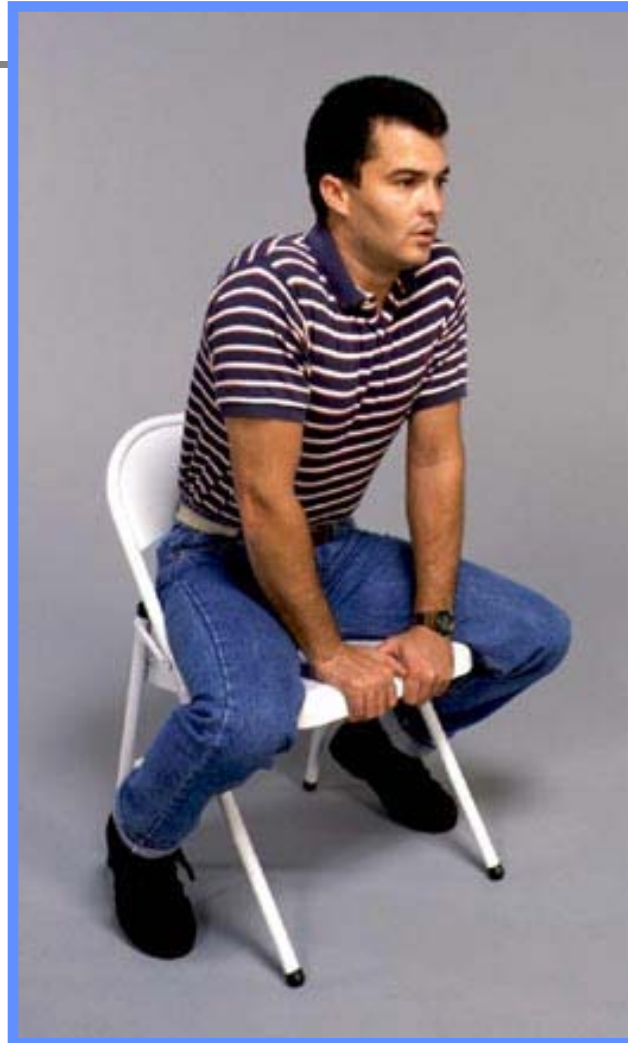
Respiratory noises
• Wheezing
• Rattling

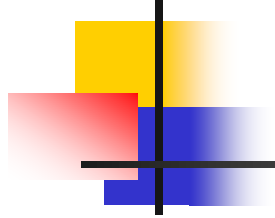
Numbness or tingling in hands and feet

Altered levels of awareness, unconsciousness, dizziness, fainting, restlessness, anxiety, confusion, combativeness

Sign of Breathing Difficulty

Tripod Position





PRESCRIBED INHALERS



Why Use MDI's?

- Reactive airway diseases:
 - Asthma primarily.
 - COPD.
 - Other lung disorders involving spasms of the airways.
 - Bronchitis
 - Pneumonia...



What Do These MDI's Do?

- Relax the airways to allow them to dilate.
 - Dilates airways.
- Reverses reactive / spastic airway disease:
 - Reduces inflammation.
 - Short term / quick acting (rescue inhaler – albuterol...)
 - Longer acting / maintenance inhalers (steroid inhalers)

Albuterol: Prescribed Multi-Dose Inhaler (MDI)





Approved EMS MDI's

- Albuterol
- Ventolin
- Proventil
- Alupent



Indications for Use of MDI Involving EMS

- S&S's of respiratory distress.
- MDI has been physician prescribed.
- Approved by Medical Control for recurrent dosing.
 - If patient has already used their MDI or has performed nebulizer treatments you must seek Medical Direction.



Contraindications for Use of MDI Involving EMS

- Patient unable to use the device.
- MDI has NOT been physician prescribed.
- Use Denied by Medical Control for recurrent dosing.
 - If patient has already used their MDI or has performed nebulizer treatments Medical Control may deny the request for additional doses.

MDI's are “Patient Assist” Interventions





Perform the Medication Checks for MDI's

- Correct medication.
- Correct dose.
- Correct / good expiration date.
- Correct condition being treated.
- Correct route of administration.
- Correct patient (patients prescribed MDI).



Using the MDI

- Shake the inhaler well.
- Warm the inhaler if indicated (winter time).
- Talk the patient through the steps.
- One dose = 2 individual “puffs” given 30 seconds to 60 seconds apart.
- Have patient stand or sit-up straight.
- Have patient forcefully exhale.
- Have the patient place the mouthpiece in their mouth – lips tight.
- As they take in a very deep breath depress the piston and continue to complete the inhalation.
- Have the patient hold their breath as long as they can comfortably then slowly exhale through their nose.

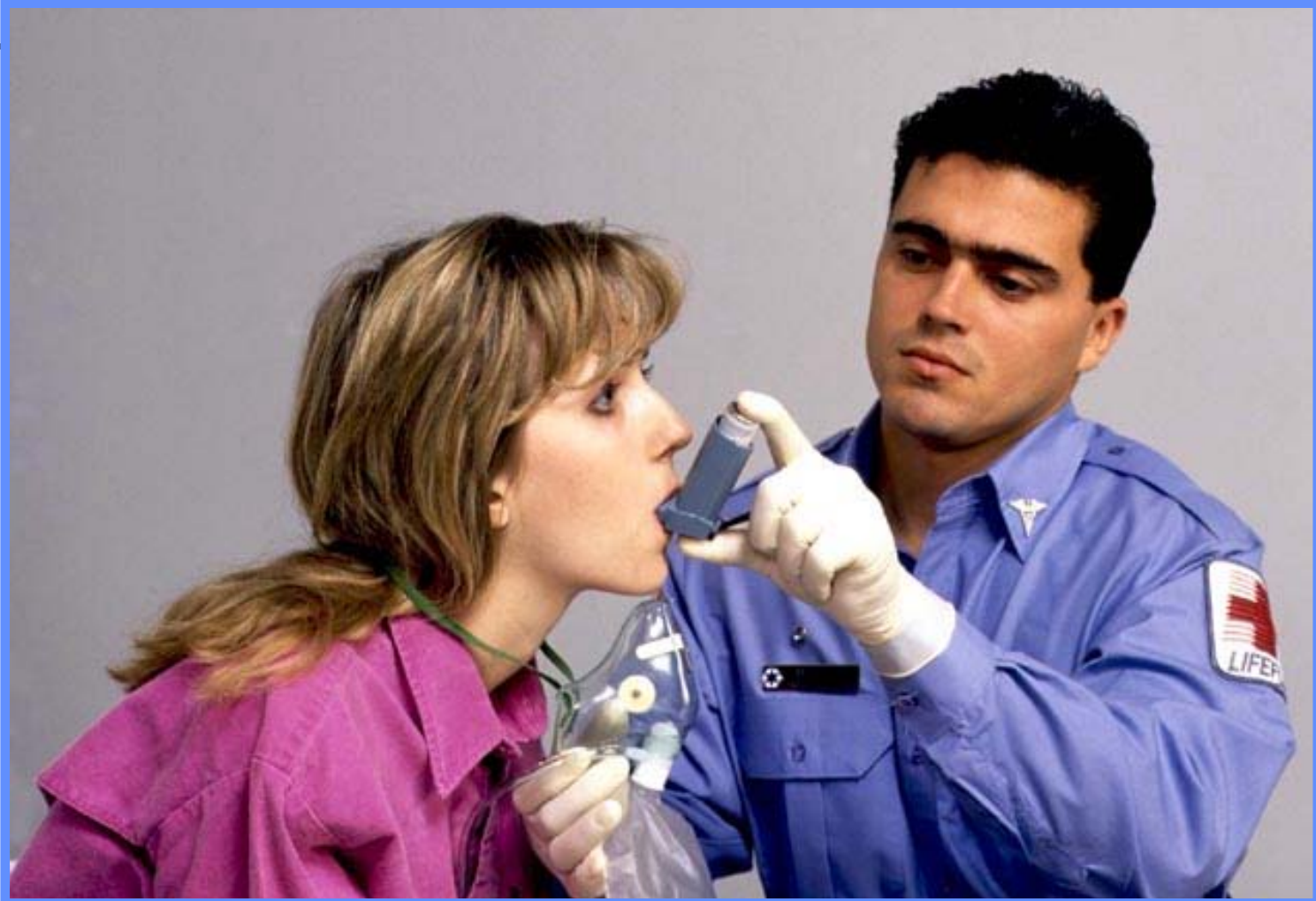
**Right Patient? Right Medication? Right Condition?
Right Dose? Right Route? Right Date?**



Shake vigorously.

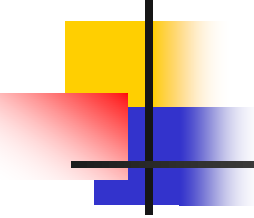


Depress hand-held inhaler as patient inhales deeply.

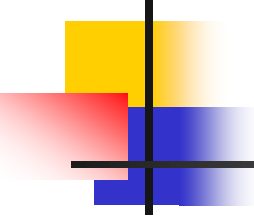


Instruct patient to hold breath.





**Have patient SLOWLY exhale
through their nose.
This allows more time for
absorption
of the medication.**



**Wait 30 to 60 seconds to administer
the 2nd puff to complete the dose.
This allows the 2nd dose to go deeper
into the lungs.**

2 puffs = 1 dose of Albuterol.

Re-evaluate patient.



Spacer Device – Allows for Better Inhalation





Side Effects with Some MDI's

- Nervousness.
- Tremors.
- A feeling of anxiousness.
- Increased pulse rate and BP.
- Dry mouth.



Reassess After All Meds

- Has the patient improved or stabilized?
- Are further doses indicated?
- Children tend to be more “hyper” than adults following the use of the rescue MDI’s.
- Use of inhalers often produce coughing initially.
 - Have tissues available.



Respiratory Diseases / Conditions

- Asthma
- Bronchitis
 - Acute
 - Chronic
- Chronic Obstructive Pulmonary Disease (COPD)
 - Emphysema
 - Pulmonary Fibrosis
- Neuro-muscular Pulmonary Conditions
 - Cystic fibrosis
 - MS
 - ALS...
- Pneumonia



The “Respiratory Drive” – Why We Breathe.

- Normal Lungs:
 - As CO₂ levels increase signals are sent from the brain to the respiratory muscles to initiate breathing or increase rate and depth of breathing.
- Severely Diseased Lungs:
 - Over time the body acclimates to higher levels of CO₂.
 - Too much oxygen suppresses respirations and can produce respiratory arrest.
 - Typically not a problem in the field setting.
 - Oxygen is given conservatively to these patients.
 - See the Maryland EMS Protocols for guidance.



Closing Comments

- Respiratory diseases and problems are frequent causes of requests for EMS.
- Aggressive airway assessment and management are vital skills for the prehospital provider.
- As air pollution and smoking continue, the rate of pulmonary disease will continue to be managed in large numbers by EMS. Learn as much as you can about pulmonary disease and various therapeutic modalities.