

## **EMS Information Bulletin- #060**

**DATE:** October 27, 2008

**SUBJECT:** Continuous Positive Airway Pressure for Basic Life Support

**TO:** Pennsylvania EMS Organizations & Personnel

**FROM:** Bureau of Emergency Medical Services  
PA Department of Health  
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The Pennsylvania Department of Health, Bureau of Emergency Medical Services (EMS), in cooperation with the Emergency Health Services Federation (EHSF), conducted a pilot study on the use of Continuous Positive Airway Pressure (CPAP) in the EHSF's region. As a result of a successful pilot study, the CPAP for Basic Life Support (BLS) Program is being implemented statewide.

For the pilot study, the EHSF located each Advanced Life Support (ALS) station within their region, plotted it on a map and then identified a 15-minute drive time. Each BLS unit was then layered over the map and any BLS unit outside of the 15 minute drive time was requested to participate in the pilot study.

The Statewide BLS Protocols are written to allow an EMT who has the appropriate training, is working with an ambulance service that meets the requirements of the CPAP program, and who has the approval of the ambulance service medical director to administer CPAP in accordance with the BLS Protocols or medical command orders. The Department of Health, Bureau of EMS, pursuant to the EMS Act (35 P.S. § 6924), has the responsibility and authority to guide and coordinate the development of emergency medical programs into a unified Statewide system. Therefore, recognizing the importance of CPAP to an effective EMS system, the Bureau of EMS is issuing the following requirements for ambulance services that wish to participate in the CPAP for BLS Program.

Regional EMS Council Requirement:

**The Regional EMS Council must have a process in place to review utilization of CPAP by BLS/ALS services.**

Ambulance Service Requirements:

Each ambulance service must meet the following requirements prior to the implementation of CPAP for BLS:

1. Identification of a medical director willing to serve in an oversight capacity in regards to the CPAP.
2. Ability to comply with Statewide BLS Protocols.
3. Maintain CPAP masks/devices adequate to treat one patient with CPAP.
4. Carry a CPAP device that has a manometer (or other means to provide specific CPAP pressure) and meets any other specifications required by the Department of Health.
5. Be approved to carry a pulse oximeter.
6. The service medical director must oversee the CPAP training, use of CPAP, and quality improvement audits.

EMS Practitioner Requirements:

Each EMS Practitioner must meet the following requirements prior to using CPAP for BLS:

1. The CPAP for BLS skill may only be used when an EMT is working with an ambulance service that complies with Department of Health requirements for carrying CPAP.
2. Only an EMT that has completed the CPAP for BLS Training Module may use the CPAP for BLS skill.
3. An EMT must be authorized to perform the CPAP for BLS skill by the ambulance service medical director.

Attachments:

1. CPAP for BLS Statewide Protocol
2. CPAP for BLS Training Module
3. CPAP Program Data Record

**RESPIRATORY DISTRESS/RESPIRATORY FAILURE  
STATEWIDE BLS PROTOCOL****Criteria:**

- A. Shortness of breath or difficulty breathing.
  - 1. Conditions which produce SOB from bronchoconstriction that may respond to bronchodilators. These conditions generally are associated with wheezing.
    - a. COPD (emphysema, chronic bronchitis)
    - b. Asthma
    - c. Allergic reaction
    - d. Respiratory infections (pneumonia, acute bronchitis)
  - 2. Conditions which produce SOB without bronchoconstriction that **do not** respond to bronchodilators. These conditions usually are not associated with wheezing.
    - a. CHF
    - b. Pulmonary embolism

**Exclusion Criteria:**

- A. None.

**System Requirements:**

- A. Only an EMT that has completed the bronchodilator module through the EMT curriculum or continuing education may assist the patient with administration of a bronchodilator.
- B. CPAP may only be administered by an EMT that has completed the DOH BLS CPAP training and has been approved to administer CPAP by the service medical director.
- C. **[Optional]** BLS services may carry CPAP devices for use by the service's EMTs.
  - 1. These services must assure that all EMTs using CPAP have completed the DOH BLS CPAP training and have been approved by the service medical director.
  - 2. These services must carry a CPAP device that has a manometer (or other means to provide specific CPAP pressure) and meets any other specifications required by the DOH.
  - 3. These services must be approved to carry pulse oximeters – See Protocol #226.
  - 4. The service medical director must oversee the CPAP training, use of CPAP, and quality improvement audits.

**Treatment:****A. All patients:**

- 1. Initial Patient Contact – see Protocol # 201.
  - a. Consider call for ALS if available. See Indications for ALS Use protocol #210
- 2. If allergic reaction is suspected and patient meets criteria, proceed with Allergic Reaction / Anaphylaxis protocol #411.

**B. Pediatric patients:**

- 1. **NOTE:** If child is sitting in a tripod position with excessive drooling this may be epiglottitis, **transport immediately**. Do not lay the patient flat and do not attempt to visualize the throat.

**C. All patients:**

- 1. Apply high concentration oxygen. If necessary, assist respirations with a bag-valve-mask, but avoid overzealous hyperventilation.
- 2. Monitor pulseoximetry<sup>1</sup> [OPTIONAL – MANDATORY IF USING CPAP]
- 3. Continuous Positive Airway Pressure (CPAP) [OPTIONAL]:
  - a. Apply CPAP to adult patient if patient does not have any contraindication to CPAP<sup>2</sup> AND has **at least TWO** of the following after high concentration oxygen:
    - 1) Pulse oximetry < 90%
    - 2) Respiratory rate > 25 bpm
    - 3) Use of accessory muscles during respiration
  - b. If CPAP is applied<sup>3</sup>:
    - 1) Titrate pressure up until either improvement or **maximum of 10 cm H<sub>2</sub>O pressure**.
    - 2) Remove CPAP if respiratory status deteriorates and assist with BVM ventilation if needed.
- 4. Assist patient with his/ her bronchodilator inhaler [EMT ONLY] for conditions associated with wheezing<sup>4,5,6</sup>
  - a. Must be a “short-acting” rapid onset, **bronchodilator**<sup>7,8</sup>
- 5. Transport and reassess enroute

6. Contact medical command if EMT is unclear whether the patient’s inhaler is a “short-acting” bronchodilator or if EMT has assisted with bronchodilator inhaler administration.<sup>9</sup>

**Possible Medical Command Orders:**

- A. May order additional doses of patient’s bronchodilator.

**Notes:**

1. See Pulsoximetry Protocol #226. Pulsoximetry may only be used by BLS services and personnel that meet DOH pulsoximetry requirements. If used, pulsoximetry must not delay the application of oxygen. Record SpO<sub>2</sub> after administration of oxygen. If pulsoximetry is used and patient does not tolerate NRB mask, may switch to nasal cannula as long as SpO<sub>2</sub> remains >95%.
2. CPAP is not indicated if patient:
  - a. has altered mental status and/or cannot follow commands.
  - b. ≤ 14 y/o, unless ordered by Medical Command
  - c. has respiratory rate < 10 **OR** apnea **OR** is unable to maintain an open airway.
  - d. has chest trauma or is suspected of having a pneumothorax.
  - e. has a tracheostomy.
  - f. is actively vomiting or has upper GI bleeding.
3. If CPAP is used:
  - a. Oxygen supply may be depleted rapidly, especially if prolonged transport times. Monitor supply to avoid complete depletion.
  - b. Assure that ALS has been requested, if available, and advise responding ALS service that CPAP is being used.
  - c. Notify hospital of CPAP use ASAP to assure that CPAP device is available on arrival. Transport patient into hospital on CPAP and do not remove until hospital therapy is ready to be placed on patient.
  - d. Watch for gastric distention, which can result in vomiting.
  - e. CPAP can be used on patient with Do-Not-Resuscitate order.
  - f. Vital signs (including pulse oximetry), must be obtained and documented every 5 minutes.
4. An EMT may assist with the medication **ONE TIME ONLY** prior to contacting Medical Command. Any subsequent administration requires direction from a medical command physician.
5. Bronchodilator inhaler must be prescribed for the patient, and EMS must identify and administer the prescribed dose (“one” or “two” inhalations) for the specific patient.
6. If unsure of the appropriate action, contact Medical Command for further direction.
7. If unable to contact medical command, may repeat previous dose of bronchodilator inhaler 20 minutes after initial dose.
6. The following are commonly prescribed short-acting, rapid-onset, beta-2 agonist inhalants that the EMT may assist with administration:

Brand Name	Generic Name
Alupent	Metaproterenol Sulfate
Brethaire	Terbutaline Sulfate
Bronkometer	Isoetharine Mesylate
Combivent	Albuterol and Ipratropium
Duo-medihaler	Isoproterenol Hydrochloride/Phenylephedrine Combo
Isuprel Mistometer	Isoproterenol Hydrochloride
Maxair	Pirbuterol Acetate
Medihaler-Iso	Isoproterenol Sulfate
Metaprel	Metaproterenol
Proventil	Albuterol
Tornalate	Biotolterol Mesylate
Ventolin	Albuterol

7. The following are drugs that **SHOULD NOT** be used:

<b>Long-acting, Delayed-Onset, Bronchodilators</b>	
<b>Brand Name</b>	<b>Generic Name</b>
Serevent	Salmeterol Xinafoate
<b>Corticosteroids</b>	
<b>Brand Name</b>	<b>Generic Name</b>
Aero-bid	Flunisolide
Azmacort	Triamcinolone Acetonide
Beclovent	Beclomethasone Dipropionate
Decadron Respighaler	Dexamethasone Sodium Phosphate
Dexacort Respighaler	Dexamethasone Sodium Phosphate
Flovent	Fluticasone Propionate
Vanceril	Beclomethasone Dipropionate
<b>Anticholinergics</b>	
<b>Brand Name</b>	<b>Generic Name</b>
Atrovent	Ipratropium Bromide
<b>Non-Steroidal Anti-inflammatories</b>	
<b>Brand Name</b>	<b>Generic Name</b>
Intal	Cromolyn Sodium
Tilade	Nedocromil Sodium
<b>Over-the-counter Drugs</b>	
<b>Brand Name</b>	<b>Generic Name</b>
Primatene Mist	Epinephrine

**Performance Parameters:**

- A. Review every case of EMT **CPAP use or** EMT-assisted bronchodilator inhaler administration for documentation for appropriate indication, appropriate medication, and appropriate contact with medical command.
- B. Consider benchmark of on scene time < 15 minutes if ALS not on scene.



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## CPAP For BLS Training Module

### 1. Introduction

- CPAP is a non-invasive procedure that is easily applied and can be easily discontinued without patient discomfort.
- CPAP application in cardiogenic pulmonary edema appears to be beneficial to patient outcome.

### 2. Objectives

- Overview of Pulmonary Anatomy & Physiology
- Overview of Respiratory Distress
- Overview of CHF
- CPAP Introduction & Overview
- Pre-hospital indications for CPAP usage
- Contraindications for CPAP Usage
- CPAP Hazards
- CPAP BLS Protocol
- CPAP Procedure
- CPAP Removal
- Documentation Requirements

### 3. Signs & Symptoms of Respiratory Distress

- Increased effort of Breathing
- Retractions and accessory muscle use
- Unequal or inadequate chest expansion
- Diminished, absent or noisy breath sounds
- Anxiety or restlessness
- Respiratory rate >25/min.
- SPO<sub>2</sub> < 90%
- Pale, cyanotic, cool, moist skin

### *CPAP Candidate Case Study*

Each EMT is expected to make an accurate assessment of a patient in respiratory distress and determine whether or not they are a candidate for CPAP.

### Patient Scenario

**Dispatch:** You are dispatched for a 70 y/o male patient with breathing problems  
**HPI:** Increasing shortness of breath for 1 day despite the use on his inhalers  
**PMH:** COPD, Hypertension, and Diabetes  
**MEDS:** Albuterol Inhaler, Lasix and Aspirin  
**PE:** Thin white male on home oxygen, breathing through pursed lips, sitting in tripod position



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**VITALS:** BP 180/90, Heart Rate 120, Respiratory Rate 30, O2 Sat 88%, LOC Alert, Airway patent

**PE Details:** HEENT: Perioral cyanosis, No JVD Pulmonary: Lung sounds reveal inspiratory and expiratory wheezes Extremities: Cyanotic, no noted pedal edema

Emergency medical care of all respiratory distress patients include airway management, supplemental oxygen, and ventilatory support.

Conditions which produce respiratory distress without bronchoconstriction that do **not** respond to bronchodilators are usually not associated with wheezing as a physical finding.

- a. CHF
- b. Pulmonary Edema

#### 4. Signs & Symptoms of Congestive Heart Failure

- Respiratory Distress (Profound)
- Accessory Muscle Use
- JVD
- Diaphoresis
- Cyanosis
- Anxiety
- Fatigue
- Pulmonary Edema due to Heart Failure (Cardiogenic Pulmonary Edema)
- Rales or Ronchi
- Productive cough (frothy sputum, may be pink in color)
- Chest Pain
- Tachycardia

Conditions that produce bronchoconstriction are generally associated with wheezing and may respond to short-acting bronchodilators.

- a. COPD
- b. Asthma
- c. Allergic Reaction
- d. Respiratory Infections (pneumonia, acute bronchitis)

#### 5. Signs & Symptoms of Chronic Obstructive Pulmonary Disease (COPD)

- Respiratory Distress
- Accessory Muscle Use
- Tripoding
- Pursed-lip breathing
- Cyanosis
- Inability to speak in complete sentences
- Audible Wheezing
- Restlessness
- Irritability
- Tachycardia



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### 6. Signs & Symptoms of Asthma

- Respiratory Distress
- Accessory Muscle Use
- Cyanosis
- Inability to speak in complete sentences
- Audible Wheezing (without stethoscope)
- Difficulty Exhaling
- Fatigue

An exaggerated immune system response to any substance (allergic reaction) may also cause an asthma attack. Severe reactions must be recognized and treated as such. The PA Statewide BLS Protocol 411-1 for Allergic Reaction/Anaphylaxis should be followed in cases of severe anaphylaxis.

### 7. Pneumonia

- Respiratory Distress (may be mild)
- Upper Respiratory Symptoms
- Wheezing (possible)
- Productive Cough (yellowish sputum)
- Chest Pain
- Fever
- Fatigue

### Inclusion Criteria

Any patient in respiratory distress with signs and symptoms consistent with asthma, COPD, pulmonary edema, CHF, or pneumonia **and** who is:

1. Awake and able to follow commands
2. Is over 14 years old and is able to fit the CPAP mask
3. Has the ability to maintain an open airway
4. **And** exhibits two or more of the following
  - a. A respiratory rate greater than 25 breaths per minute
  - b. SPO2 of less than 90% at any time
  - c. Use of accessory muscles during respirations

### Exclusion Criteria

1. Patient is in respiratory/cardiac arrest/apneic
2. Patient is suspected of having a pneumothorax or has suffered trauma to the chest
3. Patient has a tracheostomy
4. Patient is actively vomiting or has upper GI bleeding
5. Recent facial or cranial surgery
6. Recent esophageal surgery or esophageal varices
7. Stomach stapling



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### **CPAP Procedure**

1. Request ALS intercept if not enroute and if available
2. **EXPLAIN THE PROCEDURE TO THE PATIENT**
3. Ensure adequate oxygen supply to ventilation device
4. Place the patient on continuous pulse oximetry
5. Place the delivery device over the mouth and nose
6. Secure the mask with provided straps or other provided devices
7. Use 10 cm H<sub>2</sub>O of PEEP valve
8. Check for air leaks
9. Adjust flow rate and FI<sub>O</sub><sub>2</sub> to maintain adequate SpO<sub>2</sub> (95%) and to conserve O<sub>2</sub>
10. Monitor and document vital signs every 5 minutes
11. Continue to coach patient to keep mask in place and readjust as needed
12. Removal of CPAP Device (Oxygen Considerations, patient condition, etc.)
13. Documentation (Completion of Data form, PA DOH Patient Care Report)



# CPAP PROGRAM DATA RECORD

Ambulance Service Provider \_\_\_\_\_ Level of Provider \_\_\_\_\_

1. Patient Demographics: Age \_\_\_\_\_ Sex:  M  F Date of service: \_\_\_\_\_

### 2. Inclusion Criteria:

- a. Retractions or accessory muscle use Yes  No
- b. Respiratory Rate > 25/min Yes  No
- c. Pulse Ox < 90% Yes  No

3. Suspected Indication for CPAP Use:  CHF  Asthma/COPD  Pneumonia  Unsure

4. Vital Signs :	HR	RR	BP	O2 Sat	RDS*	LOC	Medications Given
Initial	_____	_____	_____	_____	_____	AVPU	_____
5 Mins.	_____	_____	_____	_____	_____	AVPU	_____
10 Mins.	_____	_____	_____	_____	_____	AVPU	_____
15 Mins.	_____	_____	_____	_____	_____	AVPU	_____
20 Mins.	_____	_____	_____	_____	_____	AVPU	_____
25 Mins.	_____	_____	_____	_____	_____	AVPU	_____
30 Mins.	_____	_____	_____	_____	_____	AVPU	_____
35 Mins.	_____	_____	_____	_____	_____	AVPU	_____
Hospital	_____	_____	_____	_____	_____	AVPU	_____

\* RDS = Respiratory Distress Score 0-10 (10 being the worst)

5. EMT perception of patient Condition upon ED Arrival:  Better  Same  Worse

6. Procedural Complications/Technical Difficulties: \_\_\_\_\_

7. CPAP discontinued before ED arrival?  Y  N If yes, why: \_\_\_\_\_

8. ALS Intercept?  Y  N Which ALS unit: \_\_\_\_\_

### TO BE COMPLETED BY REGIONAL EMS COUNCIL:

Patient required intubation?  Y  N If yes, by whom?  ALS  ED  ICU  Floor

Patient Disposition: Admitted:  ICU  Floor LOS \_\_\_\_\_ Date of Death \_\_\_\_\_ Transferred to: \_\_\_\_\_

Admission Diagnosis :  CHF  COPD  Asthma  Pneumonia  Other: \_\_\_\_\_

Was CPAP indicated and used correctly?  Y  N Comments: \_\_\_\_\_