



		<b>Performance Standard</b>	<b>7602</b>
		<b>Effective</b> <b>April 1, 2018</b>	<b>Expires</b> <b>March 31, 2019</b>
Category IV Skill – High Frequency/Low Risk: <b>Continuous Positive Airway Pressure</b>	Approval: Medical Director <b>Reza Vaezazizi, MD</b>	Signed 	
Applies To: <b>PM, MICN, BHP, EMS System</b>	Approval: REMSA Director <b>Bruce Barton</b>	Signed 	

### Terminal Performance Objective

Decreased venous return, increased alveolar recruitment, and decreased pulmonary edema resulting in the restoration of adequate cardiac output, gas exchange, and tissue perfusion.

### Before applying continuous positive airway pressure (CPAP) paramedics must:

1. Assess the patient's ABC's
2. Determine the patient is a candidate for CPAP:
  - a. Confirm the patient is experiencing dyspnea with pertinent findings suggestive of CHF, suspected exacerbation of COPD, or asthma
  - b. Confirm that patient is awake, alert and able to maintain their own airway
  - c. Confirm that assisted ventilation and/or ETI is not indicated
  - d. Recognize contraindications to CPAP:
    - i. Apneic
    - ii. Unconscious
    - iii. Pediatric (appearing to be 14 years of age or less)
    - iv. Suspected Pneumothorax
    - v. Vomiting
    - vi. Pump failure due to severe bradycardia or non-compensatory tachycardia (treat rate first)
    - vii. Systolic blood pressure of 90 mmHg or less
3. Place the patient sitting upright with lower extremities dependent to encourage pulmonary function and venous pooling
4. Provide supplemental oxygen as clinically indicated
5. Provide clinically indicated treatment following the applicable treatment protocol
6. Continue clinically indicated treatment, including pharmacologic interventions, while preparing equipment
7. Explain to the patient what they can expect to experience, while avoiding delays in treatment

### While applying continuous positive airway pressure (CPAP) paramedics must:

1. Prepare for application of the Pulmodyne™ O2-RESQ™ system
  - a. Select and prepare the appropriate size mask
  - b. Set pressure to 5 cmH<sub>2</sub>O CPAP
  - c. Prepare the head strap and circuit
  - d. Attach the system to an oxygen supply
  - e. Ensure the availability of suction, airway, and assisted ventilation supplies
  - f. Prepare to increase and titrate pressure in 2.5 – 5 cmH<sub>2</sub>O increments as clinically indicated
2. Apply the oxygen charged Pulmodyne™ O2-RESQ™ system to the patient without securing the head strap
3. Coach the patient to:
  - a. Hold the mask firmly to their own face
  - b. Inhale through nose and exhale through mouth
  - c. Continue to breathe evenly against the increasing pressure
4. Troubleshoot for leaks and adjust the mask to maintain a complete seal while applying the head strap
5. Confirm the integrity of the circuit, mask seal, and oxygen delivery to the patient
6. Immediately reassess the patient:
  - a. Pulmonary assessment including: inspiratory expiratory time ratio (normal adult I:E = 1:2), SpO<sub>2</sub>, lung sounds, and respiratory rate

- b. Cardiovascular assessment including: blood pressure and heart rate
7. Consider the need to medicate for anxiety “Related to CPAP Mask”
8. Increase CPAP in 2.5 – 5 cmH<sub>2</sub>O increments, up to 15 cmH<sub>2</sub>O maximum CPAP, as clinically indicated by the patient’s response to therapy (see “Critical Success Targets for CPAP” below)
9. Immediately re-assess the patient following each change in pressure
  - a. Pulmonary assessment including: inspiratory expiratory time ratio (normal adult I:E = 1:2), SpO<sub>2</sub>, lung sounds, and respiratory rate
  - b. Cardiovascular assessment including: blood pressure and heart rate
10. Titrate CPAP in 2.5 – 5 cmH<sub>2</sub>O increments to relief of dyspnea while continuously assessing patient’s tolerance of CPAP
11. Provide clinically indicated treatment following the applicable REMSA Treatment Protocol(s)
12. Consult online medical direction if exceeding 15 cmH<sub>2</sub>O CPAP is clinically indicated

### **Critical Success Targets for CPAP**

1. Normalizing inspiratory expiratory time ratio (normal adult I:E = 1:2)
2. SPO<sub>2</sub> greater than 94%
3. Improved signs of perfusion
4. Improvement in patient’s perceived work of breathing
5. Resolution of, or improvement in, patient’s dyspnea

### **System Benchmark**

Percentage of patients receiving CPAP with relief of, or improvement in, dyspnea

### **Applicable Protocols**

The REMSA Treatment Protocols for Dyspnea with Suspected Congestive Heart Failure (CHF) and Respiratory Distress

### **Core Competency Requirements to be Covered during Education and Training on CPAP**

1. Pulmonological and Cardiovascular Anatomy & Physiology
2. Pulmonology and Cardiology – Pathophysiology of congestive heart failure
3. Assessment of respiration and recognition of respiratory instability
4. Assessment of circulation and recognition of hemodynamic instability
5. Identification of need for CPAP and contraindications to its application
6. Proper application of device on patient
7. Patient communication techniques
8. Concurrent medication for anxiety “Related to CPAP Mask”
9. Demonstrates proper technique for use of the Pulmodyne™ O<sub>2</sub>-RESQ™ system
10. Post application recognition of deterioration and appropriate alternative treatment
11. Reassessment of patient

### **Equipment Requirements**

1. PPE
2. Model patient
3. Stethoscope
4. Blood pressure cuff
5. Oxygen equipment (tank, regulator with DISS, nasal cannula, non-rebreather mask, Pulmodyne™ O<sub>2</sub>-RESQ™ system)
6. Midazolam, Lorazepam, and/or Diazepam
7. Medication equipment (IV access, IM equipment)
8. Intubation equipment (BVM, suction, laryngoscope with selection of blades, ET tubes, etc.)

## **Instructor Resource Materials**

1. Pulmodyne™ O2-RESQ™ training materials
2. Applicable REMSA Treatment Protocols
3. NHTSA EMS Educational Instructor Guidelines for EMT and Paramedic

## Continuous Positive Airway Pressure Validation

**PERFORMANCE CRITERIA:** 100% accuracy required on all items marked with an \*

**Before applying continuous positive airway pressure, the paramedic must:**

Points	Score	Performance Steps	Additional Information
1		Take or verbalize body substance isolation	Selection: gloves, goggles, mask, gown, booties, P100 as needed
1		Assess the patient's ABC's *	
1		Determine the patient is a candidate for CPAP: *	<ol style="list-style-type: none"> <li>1. Confirm the patient is experiencing dyspnea with pertinent findings suggestive of CHF, suspected exacerbation of COPD, or asthma</li> <li>2. Confirm that patient is awake, alert and able to maintain their own airway</li> <li>3. Confirm that assisted ventilation and/or ETI is not indicated</li> <li>4. Recognize contraindications to CPAP:               <ol style="list-style-type: none"> <li>a. Apneic</li> <li>b. Unconscious</li> <li>c. Pediatric (appearing to be 14 years of age or less)</li> <li>d. Suspected Pneumothorax</li> <li>e. Vomiting</li> <li>f. Pump failure due to severe bradycardia or non-compensatory tachycardia (treat rate first)</li> <li>g. Systolic blood pressure of 90 mmHg or less</li> </ol> </li> </ol>
1		Place the patient sitting upright with lower extremities dependent to encourage pulmonary function and venous pooling	
1		Provide supplemental oxygen as clinically indicated *	
1		Provide clinically indicated treatment following the applicable treatment protocol *	
1		Continue clinically indicated treatment, including pharmacologic interventions, while preparing equipment	
1		Explain to the patient what they can expect to experience, while avoiding delays in treatment	

**While applying continuous positive airway pressure, the paramedic must:**

Points	Score	Performance Steps	Additional Information
1		Prepare for application of the Pulmodyne™ O2-RESQ™ system *	<ol style="list-style-type: none"> <li>1. Select and prepare the appropriate size mask</li> <li>2. Set pressure to 5 cmH<sub>2</sub>O CPAP</li> <li>3. Prepare the head strap and circuit</li> <li>4. Attach the system to an oxygen supply</li> <li>5. Ensure the availability of suction, airway, and assisted ventilation supplies</li> <li>6. Prepare to increase and titrate pressure in 2.5 – 5 cmH<sub>2</sub>O increments as clinically indicated</li> </ol>
1		Apply the oxygen charged Pulmodyne™ O2-RESQ™ system to the patient without securing the head strap *	
1		Coach the patient	<ol style="list-style-type: none"> <li>1. Hold the mask firmly to their own face</li> <li>2. Inhale through nose and exhale through mouth</li> <li>3. Continue to breathe evenly against the increasing pressure</li> </ol>
1		Troubleshoot for leaks and adjust the mask to maintain a complete seal while applying the head strap	
1		Confirm the integrity of the circuit, mask seal, and oxygen delivery to the patient *	
1		Immediately reassess the patient *	<ol style="list-style-type: none"> <li>1. Pulmonary assessment including: inspiratory expiratory time ratio (normal adult I:E = 1:2), SpO<sub>2</sub>, lung sounds, and respiratory rate</li> <li>2. Cardiovascular assessment including: blood pressure and heart rate</li> </ol>
1		Consider the need to medicate for anxiety “ <b>Related to CPAP Mask</b> ”	
1		Sequentially increase CPAP in 2.5 – 5 cmH <sub>2</sub> O increments, up to 15 cmH <sub>2</sub> O maximum CPAP, as clinically indicated by the patient’s response to therapy *	<ol style="list-style-type: none"> <li>1. Normalizing inspiratory expiratory time ratio (normal adult I:E = 1:2)</li> <li>2. SPO<sub>2</sub> greater than 94%</li> <li>3. Improved signs of perfusion</li> <li>4. Improvement in patient’s perceived work of breathing</li> <li>5. Resolution of, or improvement in, patient’s dyspnea</li> </ol>
1		Immediately re-assess the patient following each change in pressure *	<ol style="list-style-type: none"> <li>1. Pulmonary assessment including: inspiratory expiratory time ratio (normal adult I:E = 1:2), SpO<sub>2</sub>, lung sounds, and respiratory rate</li> <li>2. Cardiovascular assessment including: blood pressure and heart rate</li> </ol>

1		Titrate CPAP in 2.5 – 5 cmH <sub>2</sub> O increments to relief of dyspnea while continuously assessing patient’s tolerance of CPAP *	
1		Provide clinically indicated treatment following the applicable REMSA Treatment Protocol(s)	
1		Consult online medical direction if exceeding 15 cmH <sub>2</sub> O CPAP is clinically indicated	
1		Accurately document all assessment findings, therapeutic treatments, and the patient’s response to therapy	

### Critical Failure Criteria

- \_\_\_ Failure to take or verbalize BSI appropriate to the skill prior to performing the skill
- \_\_\_ Failure to assess the patient’s ABC’s
- \_\_\_ Failure to determine the patient is a candidate for CPAP
- \_\_\_ Failure to provide supplemental oxygen as clinically indicated
- \_\_\_ Failure to provide clinically indicated treatment following the applicable treatment protocol
- \_\_\_ Failure to prepare for application of the Pulmodyne™ O2-RESQ™ system
- \_\_\_ Failure to apply the oxygen charged Pulmodyne™ O2-RESQ™ system to the patient
- \_\_\_ Failure to confirm the integrity of the circuit, mask seal, and oxygen delivery to the patient
- \_\_\_ Failure to immediately reassess the patient
- \_\_\_ Failure to sequentially increase CPAP in 2.5 – 5 cmH<sub>2</sub>O increments as clinically indicated by the patient’s response
- \_\_\_ Failure to immediately re-assess the patient following each change in pressure
- \_\_\_ Failure to titrate CPAP in 2.5 – 5 cmH<sub>2</sub>O increments to relief of dyspnea
- \_\_\_ Any procedure that would have harmed the patient