EMS INTER-FACILITY TRANSPORT WITH MECHANICAL VENTILATOR COURSE OBJECTIVES

GENERAL PROVISIONS:

Individuals providing Inter-facility transport with Mechanical Ventilator must have successfully completed a training program which has been approved by the Division and meets the EMS Division approved program requirements and objectives. EMS personnel shall be issued a course completion record that must be filed with the Division. A refresher course must be completed every 2 years. Application and program approval requirements are located in the Prehospital Continuing Education Provider Policy located at: http://www.co.kern.ca.us/ems/PCEP_Policy_2_1_2013.pdf.

TERMINAL OBJECTIVES:

At the completion of this unit of instruction, the participant shall be able to:

1. Integrate concepts of respiratory anatomy and physiology and pathophysiology into the assessment and management of the adult.
2. Formulate a treatment plan to include pharmacological and mechanical interventions for the patient with respiratory compromise.
3. Identify common ventilator controls and their physiological effects.
4. Identify, troubleshoot and correct complications and adverse effects during transport.

COGNITIVE Course Content (5 Hour Minimum):

Cognitive course content shall include:

Cognitive Course Objectives:

1. Discuss the anatomy and physiology of the respiratory system to include upper and lower airway anatomy, mechanics of ventilation and oxygenation, gas exchange, and oxyhemoglobin dissociation.
2. Assess the respiratory system by obtaining relevant history, physical exam, breath sounds and percussion.
3. Define ventilation and discuss the physiology of ventilation and respiration.
4. Compare the inspiration and expiration as to the direction of air movement, use of energy, and muscles involved.

5. Identify causes, pathophysiology, and stages of respiratory failure

6. Define the following terms related to ventilation, including elastance, surfactant, compliance, airway resistance, work of breathing, tidal volume, anatomic dead space, and alveolar ventilations.

7. List significant inspection findings related to respiratory distress and failure.

8. Compare the management of patients using diagnostic equipment such as pulse oximetry, capnography and identity normal and abnormal readings and solutions.

9. Identify adventitious sounds that are characterized as continuous and discontinuous.

10. Relate clinical conditions that produce crackles, wheezes and rhonchi.

11. Formulate a differential diagnosis of acute and chronic conditions.

12. Formulate a management plan for transporting the patient in respiratory failure.

13. Interpret acid-base balance and arterial blood gases and the effects of proper and improper ventilation on lab values and the consequences of abnormal lab values.

14. Identify common pathological events that affect the pulmonary system.

15. Discuss abnormal assessment findings associated with pulmonary diseases and conditions.

16. Compare various airway and ventilation techniques to include invasive and noninvasive, used in the management of pulmonary diseases.

17. Review the pharmacological preparations that may be used for management of respiratory disease (including sedation and analgesia), conditions administered in hospital and in transport to include but not be limited to, indications, contraindications, drug interactions, side effects, and expected duration.

18. Describe the epidemiology, pathophysiology, assessment findings, and management for the following respiratory diseases and conditions:

    a. Bronchial asthma
    b. Chronic bronchitis.
    c. Emphysema
    d. Pneumonia
    e. Pulmonary Edema
    f. Spontaneous pneumothorax
    g. Respiratory Distress Syndrome
    h. Pulmonary thromboembolism

i. Respiratory failure
j. Atelectasis
k. Hemothorax
l. Pleural effusion.

18. Discuss the indications, contraindications, complications, equipment and techniques for the following:

    a. Tracheobronchial suctioning for the intubated patient.
    b. Management of tracheostomies
    c. Alternative methods for endotracheal intubation
    d. Needle/Surgical cricothyrotomy
    e. Needle thoracostomy
    f. End-tidal CO2 monitoring
    g. Bag –Valve-Mask Technique
    h. Mechanical Transport Ventilator

19. Identify common ventilatory controls/terminology and their physiological effects.

    a. Rate
    b. Tidal Volume
    c. I- time
    d. E-time
    e. Inspiratory flow
    f. I:E ratio
    g. PEEP
    h. FIO2
    i. Mode (CPAP, Intermittent, etc)
    j. Peak flow rate or inspiratory time
    k. Sensitivity
    l. Pressure support
    m. End Title CO2
    n. Ideal body weight
    o. Low tidal volume ventilation
    p. Plateau pressure

20. Evaluate for adverse effects and complications of ventilation to include, but not limited to:

    a. Increased intrathoracic pressure
    b. Decrease venous return to the heart and decrease cardiac output (hypotension, tachycardia).
    c. Increased V/Q ratio (Ventilation/perfusion)
    d. Decrease blood flow to the kidney with resultant fluid retention (edema)
    e. Air trapping and intrinsic PEEP (auto PEEP)
    f. Barotrauma
    g. Nosocomial infections of the lungs and sinuses
    h. respiratory alkalosis

i. Agitation and increased respiratory distress
j. Increased work of breathing

PSYCHOMOTOR OBJECTIVES (1 Hour Minimum)

At the completion of this unit of instruction, the participant will be able to:

1. Perform orotracheal intubation procedure on a manikin with assessment of placement, confirmation using all Division approved devices and troubleshooting techniques.
2. Demonstrate competency in placement of perilaryngeal airway, needle cricothyroid placement, and needle decompression of chest.
3. Demonstrate the setup, operation, maintenance and troubleshooting of a mechanical ventilator.
4. Demonstrate procedure to transfer ventilator patient.
5. Demonstrate correct calculation of ideal body weight (may include using an application).
6. Demonstrate competency in recognition of adverse effects/complications including interpretations of abnormal end tidal capnography waveforms.
7. Assess lung sounds and proper tube placement.

AFFECTIVE OBJECTIVES

At the completion of this unit of instruction the participant shall be able to:

1. Defend the need and management for controlled ventilations, oxygenation, and airway control in the adult patient in transport.

WRITTEN TEST

At the completion of this course the participant shall take a written test that addresses key topics listed in the cognitive objectives above. The participant must pass the written test with a score of at least 80%. Copies of testing material must be kept for records keeping purposes.

SKILLS VERIFICATION

At the completion of this course the participant shall preform a skills verification that demonstrates the participant is proficient in the use of the mechanical ventilation device.

The skills instructor must create a scoring system that verifies competency in the psycho-motor objectives listed above. The participant must pass the skills verification with a score of at least 80%. Copies of the testing material must be kept for records keeping purposes.

REFRESHER COURSE

At least every 2 years a refresher course must be completed. The refresher course must include content listed in the cognitive and psycho-motor objectives above. The course must be at least 3 hours in length with 2 hours devoted to cognitive review and 1 hour devoted to psycho-motor review. The refresher course must include the same testing procedures as required in the initial course.