HUDSON VALLEY REGIONAL
EMERGENCY MEDICAL SERVICES COUNCIL, INC.

33 Airport Center Drive Suite 204, Second Floor

New Windsor, NY 12553
(845) 245-4292 Phone
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hvremsco@hvremsco.org

COLLABORATIVE AGREEMENT

Administration of Nebulized Albuterol by EMT-Basics

As per Hudson Valley Regional Medical Advisory (HVREMAC) requirements,

Agency Name: _____
(Hereafter referred to as the Agency)

and

Medical Director: _____
(Hereafter referred to as the Agency Medical Director)

enter into this collaborative agreement in which;

1. The Agency will acquire, store, account, and dispose of Albuterol according to written policies and procedures which have been developed as recommended by New York State Department of Health Policy Statement 00-15 “Storage and Safeguarding of Medications Administered by EMT-Bs”;
2. The Agency will ensure that the New York State Basic Life Support Adult and Pediatric Treatment Protocols are utilized by all participating personnel for the proper administration of Nebulized Albuterol;
3. The Agency will ensure that Nebulized Albuterol will only be administered by authorized EMT(s) who have successfully completed a training program which includes lesson 4-1 and 4-2 of the New York State Department of Health Emergency Medical Technician – Basic Curriculum and the HVREMAC approved BLS Nebulized Albuterol Administration Training Curriculum;
4. The Agency will require that all Nebulized Albuterol administrations are documented appropriately by utilizing the New York State approved Patient Care Report (PCR). Additionally, all Albuterol administrations will be reported to the HVREMAC utilizing the approved quality improvement form;
5. The Agency agrees to include the review of all BLS Nebulized Albuterol administrations in the Agency’s quality improvement plan that is required by the New York State Department of Health;
6. The Agency will review this agreement on an annual basis and will file a new Collaborative Agreement with the Hudson Valley Regional EMS Council if the Agency Medical Director, or any of the contents of this agreement, changes.

_____ _____
Name of Authorized Agency Representative **Title**

_____ _____
Signature **Date**

_____ _____
Agency Medical Director’s Signature **Date**

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BLS Nebulized Albuterol Administration Application

Agency Name _____

Agency Code _____

Agency Address _____

Agency Phone _____

Agency Fax _____

Agency Contact Name _____

Agency Medical Director _____

Medical Director Address _____

Medical Director Phone _____

Medical Director Fax _____

Number of vehicles that will contain Nebulized Albuterol: _____

Has a restocking plan been developed with your Medical Director? ☐ Yes ☐ No

_____ _____ _____

Signature of Agency Official Date Signature of Medical Director

To be completed by Regional Office

Date Received _____

Received by _____

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BLS Administration of Nebulized Albuterol Quality Improvement Report

To be completed by the EMT who has administered Albuterol
According to the Collaborative Protocol

Upon completion of this report, please attach to the YELLOW copy of the PCR and Submit to the HVREMS office along with the monthly PCR submissions.

How bad is the Patient's Shortness of Breath? (Borg Scale)

0	1	2	3	4	5	6	7	8	9	10
None	***Slight***			***Moderate***			***Moderately-Severe***			***Severe***
0	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**

Please complete as much information as possible on back!

BLS Administration of Nebulized Albuterol

Date of Incident:_____ PCR #:_____ Agency Code:_____ EMT #:_____

Patient's Age:_____ Sex(M/F):_____ Time Patient Contact Began:_____ Time Patient Contact Ended : _____

Patient Had History of Asthma?(Y/N):_____ Patient Had Cardiac History?(Y/N): _____

Was Patient Able to Perform Peak Flow Test? (Y/N):_____ If So, what was the Reading? _____

Was Patient Able to give a Self Assessment (Borg Scale)?(Y/N):_____ If So, what was the rating? (0-10) _____

Time of Asthma Onset (If Known)?_____ Time of Albuterol Administration? 1st_____ 2nd _____

Did the Patient Show Improvement in Their Respiratory Status? (Y/N):_____ If So, How?_____

_____

Did the Patient's Respiratory Status Worsen? (Y/N):_____ If So, How?_____

_____

Was ALS Available? (Y/N):_____ If Not, Why?_____

Was Medical Control Contacted? (Y/N)::_____ If So, Name of Medical Control Physician?_____

Name of Transporting Ambulance Service?_____

Name of Receiving Hospital?_____

Level of Care Patient was Turned Over to? (Please Circle): AEMT EMT-CC EMT-P RN MD

Difficulty Breathing: Asthma / Wheezing

For pediatric see,"Difficulty Breathing: Asthma / Wheezing - Pediatric" or "Difficulty Breathing: Stridor - Pediatric"

CRITERIA

- Patients with effective but increased work of breathing with wheezing
    - Excludes traumatic causes of dyspnea
    - Excludes pneumothorax

CFR AND ALL PROVIDER LEVELS

- Assess for foreign body airway obstruction
    - Refer immediately to the "Extremis: Foreign Body Obstructed Airway" protocol, if indicated
- Ongoing assessment of the effectiveness of breathing
    - Refer to the "Extremis: Respiratory Arrest / Failure" protocol, if necessary
- Administer supplemental oxygen; refer to the "Resources: Oxygen Administration" protocol
- Assist patient with his or her own medications as appropriate, see "Resources: Prescribed Medication Assistance" protocol
- Facilitate transportation, ongoing assessment, and supportive care

CFR STOP

EMT

- If patient is wheezing:
    - Administer albuterol 2.5 mg in 3 mL (unit dose) via nebulizer*
        - Oxygen powered nebulizer devices for use in accordance with manufacturer specifications (typically ~6-8 LPM)
    - May repeat to a total of three doses if symptoms persist
- Continuous Positive Airway Pressure (CPAP) 5-10 cm H_2O, as needed*
- If the patient is in severe distress, see medical control considerations for use of epinephrine

EMT STOP

MEDICAL CONTROL CONSIDERATIONS

- Additional albuterol
- Epinephrine for critical asthma attack* (EMT Syringe Epinephrine or autoinjector)

KEY POINTS/CONSIDERATIONS

- Wheezing does not always indicate asthma. Consider allergic reaction, airway obstruction, and pulmonary edema
- Allow the patient to maintain position of comfort when safe to do so
    - Do not force the patient to lie down
    - Do not agitate the patient

Difficulty Breathing: Asthma / Wheezing – Pediatric

CRITERIA

- Patients with increased work of breathing (retractions, grunting, nasal flaring) and prolonged expiration, wheezing and/or poor air movement
    - Excludes traumatic causes of dyspnea
    - Excludes pneumothorax
    - Excludes stridor / croup (see "Difficulty Breathing: Stridor - Pediatric" protocol)

CFR AND ALL PROVIDER LEVELS

- Assess for foreign body airway obstruction
    - Refer immediately to the "Extremis: Pediatric Foreign Body Obstructed Airway" protocol, if indicated
- Ongoing assessment of the effectiveness of breathing
    - Refer to the "Extremis: Pediatric Respiratory Arrest / Failure" protocol, if necessary
- Allow patient to determine position of comfort. If patient cannot do so, have patient sit upright or elevate the head of the stretcher
- Administer supplemental oxygen; refer to the "Resources: Oxygen Administration" protocol
- Assist patient with their own asthma medications (see "Resources: Prescribed Medication Assistance" protocol), as appropriate
- Facilitate transportation, ongoing assessment, and supportive care

CFR STOP

EMT

- Administer albuterol 2.5 mg in 3 mL (unit dose) via nebulizer* set at 5-8 LPM
    - May repeat to a total of three doses if symptoms persist
- If the patient is in severe distress, see medical control considerations for use of epinephrine
- For older pediatric patients consider CPAP for EMT, as equipment size allows if available and trained

EMT STOP

MEDICAL CONTROL CONSIDERATIONS

- Additional albuterol
- Epinephrine for critical asthma attack* (EMT Syringe Epinephrine kits or autoinjector)

KEY POINTS/CONSIDERATIONS

- Expiratory wheezing does not always indicate asthma. Consider allergic reaction, airway obstruction, pulmonary edema
- In children under 2 yr old, bronchiolitis is the most common cause of wheezing. Bronchiolitis may not respond to albuterol. Gentle nasal suctioning is the primary treatment along with oxygen, particularly in infants.

- Allow the patient to maintain position of comfort when safe to do so
    - Do not force the patient to lie down
    - Do not agitate the patient
- Observe airborne and/or droplet precautions in appropriate patients, such as those with suspected pertussis (whooping cough)
- Do not delay transport to complete medication administration
- *If equipped and trained

- Observe airborne and/or droplet precautions in appropriate patients, such as those with suspected tuberculosis
- Do not delay transport to complete medication administration
- *If equipped and trained

New York State
Department of Health
Bureau of Emergency Medical Services

POLICY STATEMENT

Supersedes/Updates: 00-15

No. 09-11

Date: December 28, 2009

Re: Storage and Safe Guarding of Medications Administered by EMT-Bs.

Purpose

The medications approved for use by Emergency Medical Technician - Basics (EMT-B) are considered to be lifesaving measures. As such, care should be taken to allow for immediate access, while safe guarding the medications when not caring for a patient. This policy is developed to address concerns regarding the storage and safe-guarding of medications that may be administered in accordance with state and regional BLS protocols by EMT-Bs.

Policy

Prior to implementing prehospital medication administration, each agency must receive approval from their Regional Emergency Medical Advisory Committee (REMAC). All EMS agencies carrying medications for use by EMT-Bs, prior to placing them in service, must develop policies and procedures that include, but may not be limited to the following items; inventory control, storage, expiration and replacement of these items and the process for provider education.

In an effort to assist agencies in maintaining control of the medications that may be administered by EMT-Bs, the following should be the minimum requirements implemented by each service providing this level of care.

- The medications must be stored in an environment that protects them from extreme temperature changes and light. According to most medication manufacturer's guidelines, medications must be stored at temperatures that range from 59 degrees to 77 degrees[1].
- All medications must be secured in a container or location capable of being secured with a lock or numbered tear-away-type inventory control tag when not being used for patient care.
- The medication must be placed in either a closed ambulance compartment or inside a bag or box that is taken to the patient's side.
- It is strongly recommended that BLS medications not be placed in the same locked cabinet with medications, syringes or needles used by Advanced Life Support Providers.
- The EMS agency must provide safe disposal for medical waste/sharps on EMS vehicles.

[1] New Jersey – Drug Adulteration Study, October, 1995

Hudson Valley Regional EMS Council
BLS Nebulized Albuterol Administration
Training Curriculum

Objectives (cognitive):

- Identify the various causes of dyspnea that may mimic asthma.
- Identify the signs of respiratory distress.
- Differentiate between respiratory distress and respiratory failure.
- Describe the assessment of a patient with respiratory distress.
- Discuss the general pathophysiology of asthma.
- List the signs and symptoms of asthma.
- Describe the B.L.S. treatment for a patient with respiratory distress.
- Describe the B.L.S. treatment for a patient with respiratory failure.
- Identify when A.L.S. should be requested for asthma care.
- List 5 diagnostic signs and symptoms that must be assessed and documented prior to the first Albuterol treatment.
- Recite the indications for the use of Albuterol.
- Discuss the pharmacological actions of Albuterol.
- Identify the "5 Rights" of medication administration.
- Identify the proper dose of Albuterol for patients between the age of 1 and 65.
- Recite the B.L.S. protocol for the administration of Albuterol.
- List 6 diagnostic signs and symptoms that must be assessed and documented following the Albuterol treatment(s).
- Recite the procedure for documenting treatment and for recording changes of the patient's condition.

Objectives (Psychomotor)

- Demonstrate assessment of respiratory rate and quality.
- Detect accessory muscle use.
- Demonstrate proper assessment of lung sounds.
- Demonstrate the use of the "Borg" scale.
- If available, demonstrate proper use of a peak flow meter and recall when to use it.
- Demonstrate how to assemble a nebulizer and attach it to an oxygen tank.
- Demonstrate how to measure the proper dose of Albuterol.
- Demonstrate how to administer the nebulized Albuterol.
- Perform a thorough post treatment assessment of a patient.

Note: *BLS Nebulized Albuterol Curriculum shall be conducted as indicated by the EMS agency's Medical Director, by training personnel, who at a minimum, are certified by the New York State Department of Health at the AEMT-P provider level.*

I. Differential Diagnosis of Bronchospasm

1. COPD
2. Pulmonary embolus
3. Anaphylactic reactions
4. Pulmonary edema
5. Asthma

II. Pathophysiology

A. Reversible smooth muscle spasm of the airway associated with hypersensitivity of the airway to different stimuli.

1. Smooth muscle contraction
2. Mucosal edema
3. Mucous plugging

B. Triggers of Asthma Attacks

1. Allergies
2. Infection
3. Stress
4. Temperature change
5. Seasonal changes

C. Signs and Symptoms

1. Dyspnea
2. Wheezing
3. Tachypnea
4. Tachycardia
5. Cyanosis
6. Cough
7. Accessory muscle use
8. Inability to speak in complete sentences
9. Anxiety (hypoxia)
10. Prolonged expiratory phase
11. Tripod positioning

III. Assessment

A. Solicit patient history

1. Chief complaint
2. History of present illness
    a) How long
    b) Events leading up to
    c) How severe
    d) Aggravating / Alleviating factors
    e) Other complaints
    f) Steroid use in last 24 hours (PO / inhaled)

g) Other medications

3. Past medical history
    a) Confirm asthma history
    b) Other medical conditions (cardiac?)
    c) E.D. visits for asthma in last 12 months
    d) Hospital admissions for asthma in last 12 months
    e) Previously intubated due to asthma?
    f) Allergies to medications etc.

B. Physical Exam

1. Position found (tripod position)
2. Pursed lip breathing
3. Vital signs
4. Ability to speak in complete sentences
5. Accessory muscle use
6. Lung sounds
    a) No Wheezing
    b) Audible wheezing without a stethoscope
    c) Audible with a stethoscope
    d) Poor air movement (decreased breath sounds)
7. Patient self-assessment of severity (Borg scale)
8. Peak flow (for age 5 and over, if available) or Lethargy/irritability (for patients under 5 years of age)

IV. Pharmacology: Albuterol

A. Actions

1. Bronchodilator
2. Minimal side effects

B. Indications

1. Relief of bronchospasm
2. Use with caution in patients with pertinent cardiac history

C. Contraindications

1. Patients with known hypersensitivity to the drug

V. Albuterol Administration – The 5 "Rights"

A. Time

1. Patient experiencing an exacerbation of their previously diagnosed asthma

B. Patient

1. Is not in respiratory failure
2. Is between one (1) and sixty-five (65) years of age
3. Is not allergic to Albuterol
4. For patients with a history of angina, myocardial infarction, arrhythmia or congestive heart failure, **approval received from medical control**

C. Drug

Check Albuterol three (3) times prior to administration for

1. Name/Label/Expiration
2. Discoloration
3. Particulate matter/clarity

D. Dose

1. One unit dose (2.5mg/3cc or 0.083%) via nebulizer @ 6-10 LPM. or at a flow rate that will deliver the drug over 5 to 15 minutes
2. Dose may be repeated once, after 10 minutes, if symptoms persist, for a total of two (2) doses

E. Route

1. Adult – nebulized Albuterol on a standard handheld nebulizer.
2. Pediatric – nebulized Albuterol on a standard handheld nebulizer or via non-rebreather.

MODULE 4
Medical / Behavioral and Obstetrics / Gynecology

Lesson 4-1
General Pharmacology

OBJECTIVES

Objectives Legend
C = Cognitive P = Psychomotor A = Affective
1 = Knowledge level
2 = Application level
3 = Problem-solving level

COGNITIVE OBJECTIVES

At the completion of this lesson, the EMT-Basic student will be able to:

4-1.1 Identify which medications will be carried on the unit.(C-1)
4-1.2 State the medications carried on the unit by the generic name.(C-1)
4-1.3 Identify the medications with which the EMT-Basic may assist the patient with administering.(C-1)
4-1.4 State the medications the EMT-Basic can assist the patient with by the generic name.(C-1)
4-1.5 Discuss the forms in which the medications may be found.(C-1)

AFFECTIVE OBJECTIVES

At the completion of this lesson, the EMT-Basic student will be able to:

4-1.6 Explain the rationale for the administration of medications.(A-3)

PSYCHOMOTOR OBJECTIVES

At the completion of this lesson, the EMT-Basic student will be able to:

4-1.7 Demonstrate general steps for assisting patient with self-administration of medications.(P-2)
4-1.8 Read the labels and inspect each type of medication.(P-2)

Preparation

Motivation:	Later in this course the EMT-Basic student will be learning specific medications which may be administered to a patient who has his own prescribed medication for a specific medical condition. Some medications may be administered by the EMT-Basic when there are patients with specific chief complaints. Giving the proper medication in an emergency situation is critical to the well-being of the patient.
Prerequisites:	BLS, Preparatory, Airway and Patient Assessment.

MATERIALS

AV Equipment:	Utilize various audio-visual materials relating to general pharmacology. The continuous design and development of new audio-visual materials relating to EMS requires careful review to determine which best meet the needs of the program. Materials should be edited to assure meeting the objectives of the curriculum.
EMS Equipment:	None

PERSONNEL

Primary Instructor:	Advanced-level provider who has administered medications.
Assistant Instructor:	The instructor-to-student ratio should be 1:6 for psychomotor skill practice. Individuals used as assistant instructors should be knowledgeable in general pharmacology.
Recommended Minimum Time to Complete:	One hour

PRESENTATION

Declarative (What)

I. Overview - the importance of medications and the dangers associated with their administration.

II. Medications (carried on the EMS unit)
   A. Activated Charcoal - learned as a part of the poison/overdose module (4-6)
   B. Syrup of Ipecac - learned as a part of the poison/overdose module (4-6).
   C. Oral Glucose - learned as a part of the diabetes module (4-4).
   D. Oxygen (refer to airway module).

III. Medications (prescribed by a physician and the patient has them in his possession; they are not carried on the EMS unit. May assist patients in taking, with approval by medical direction).
   A. Inhaler - learned as a part of the respiratory module (4-2).
   B. Nitroglycerin - learned as a part of the cardiac module (4-3).
   C. Epinephrine - learned as a part of the allergies module (4-5).

IV. Medication names
   A. Generic
      1. The name listed in the U.S. Pharmacopedia, a governmental publication listing all drugs in the U.S.
      2. Name assigned to drug before it becomes officially listed. Usually a simple form of the chemical name.
      3. Give examples per local protocol.
   B. Trade
      1. Brand name is the name a manufacturer uses in marketing the drug.
      2. Give examples.

V. Indications - the indication for a drug's use includes the most common uses of the drug in treating a specific illness.

VI. Contraindications - situations in which a drug should not be used because it may cause harm to the patient or offer no effect in improving the patient's condition or illness.

VII. Medication Form
   A. Medications the EMT-Basic carries on the unit or medications that a patient may have a prescription for that the EMT-Basic may assist with administration.
      1. Compressed powders or tablets - nitroglycerin
      2. Liquids for injection - epinephrine
      3. Gels - glucose

4. Suspensions - activated charcoal
5. Fine powder for inhalation - prescribed inhaler
6. Gases - oxygen
7. Sub-lingual spray - nitroglycerin
8. Liquid/vaporized fixed dose nebulizers

B. Each drug is in a specific medication form to allow properly controlled concentrations of the drug to enter into the blood stream where it has an effect on the target body system.

C. Medications have a specific shelf life and expiration dates.

VIII. Dose - state how much of the drug should be given.

IX. Administration - state route by which the medication is administered such as oral, sublingual (under the tongue), injectable, or intramuscular.

X. Actions - state desired effects a drug has on the patient and/or his body systems.

XI. Side Effects - state any actions of a drug other than those desired. Some side effects may be predictable.

XII. Re-assessment strategies

A. Repeat vital signs.

B. Must be done as part of the on-going patient assessment.

C. Documentation of response to intervention.

SUGGESTED APPLICATION

Procedural (How)

Demonstrate reading labels and inspecting each medication that will be carried on the unit or assisted with by the patient.

Contextual (When, Where, Why)

For years the primary medication used by the EMT was oxygen. The EMT-Basic will have activated charcoal, syrup of Ipecac and oral glucose on the unit to administer with medical direction. In addition, the EMT-Basic will be able to assist patients with several medications, again under the supervision of medical direction.

This pharmacology lesson will assist you in understanding basic components for each of the medications. In later lessons, you will obtain additional knowledge and skills concerning their administration.

STUDENT ACTIVITIES

Auditory (Hear)

1. The student will hear information on medications they will use on the EMS unit.

Visual (See)

1. The student will see each type of medication they will use on the EMS unit.

Kinesthetic (Do)

1. The student will practice inspecting and reading the labels of each type of medication they will use on the EMS unit.

INSTRUCTOR ACTIVITIES

Supervise student practice.
Reinforce student progress in cognitive, affective, and psychomotor domains.
Redirect students having difficulty with content (complete remediation forms).

EVALUATION

Written: Develop evaluation instruments, e.g., examinations, verbal reviews, handouts, to determine if the students have met the cognitive and affective objectives of this lesson.

Practical: Evaluate the actions of the EMT-Basic students during role play, practice or other skill stations to determine their compliance with the cognitive and affective objectives and their mastery of the psychomotor objectives of this lesson.

REMEDIATION

Identify students or groups of students who are having difficulty with this subject content. Complete remediation sheet from the instructor's course guide.

SUGGESTED ENRICHMENT

What is unique in the local area concerning this topic? Complete enrichment sheets from the instructor's course guide and attach with lesson plan.

MODULE 4
Medical / Behavioral and Obstetrics / Gynecology

Lesson 4-2
Respiratory Emergencies

OBJECTIVES

Objectives Legend
C = Cognitive P = Psychomotor A = Affective
1 = Knowledge level
2 = Application level
3 = Problem-solving level

COGNITIVE OBJECTIVES

At the completion of this lesson, the EMT-Basic student will be able to:

4-2.1 List the structure and function of the respiratory system.(C-1)
4-2.2 State the signs and symptoms of a patient with breathing difficulty.(C-1)
4-2.3 Describe the emergency medical care of the patient with breathing difficulty.(C-1)
4-2.4 Recognize the need for medical direction to assist in the emergency medical care of the patient with breathing difficulty.(C-3)
4-2.5 Establish the relationship between airway management and the patient with breathing difficulty.(C-3)
4-2.6 List signs of adequate air exchange.(C-1)
4-2.7 List signs of inadequate air exchange.
4-2.8 State the generic name, medication forms, dose, administration, action, indications and contraindications for the prescribed inhaler.(C-1)

AFFECTIVE OBJECTIVES

At the completion of this lesson, the EMT-Basic student will be able to:

4-2.9 Defend EMT-Basic treatment regimens for various respiratory emergencies.(A-1)
4-2.10 Explain the rationale for administering an inhaler.(A-3)

PSYCHOMOTOR OBJECTIVES

At the completion of this lesson, the EMT-Basic student will be able to:

4-2.11 Demonstrate the emergency medical care for breathing difficulty.(P-1,2)
4-2.12 Perform the steps in facilitating the use of an inhaler.(P-2)

PREPARATION

Motivation: Over 200,000 persons die from respiratory emergencies each year.

One large city reported 12% of their ambulance runs were respiratory emergencies. This represented three times the calls for heart attacks.

Prerequisites: BLS, Preparatory, Airway and Patient Assessment.

MATERIALS

AV Equipment:	Utilize various audio-visual materials relating to respiratory emergencies. The continuous design and development of new audio-visual materials relating to EMS requires careful review to determine which best meet the needs of the program. Materials should be edited to assure meeting the objectives of the curriculum.
EMS Equipment:	Handheld inhaler suitable for training purposes and various spacer devices.

PERSONNEL

Primary Instructor:	One Advanced-Level Provider or EMT-Basic instructor who is knowledgeable in respiratory diseases and Handheld inhalers.
Assistant Instructor:	The instructor-to-student ratio should be 1:6 for psychomotor skill practice. Individuals used as assistant instructors should be knowledgeable in respiratory emergencies.
Recommended Minimum Time to Complete:	Two and one half hours

PRESENTATION

Declarative (What)

I. Anatomy review
  A. Respiratory
    1. Nose and mouth
    2. Pharynx
      a. Oropharynx
      b. Nasopharynx
    3. Epiglottis - a leaf-shaped structure that prevents food and liquid from entering the trachea during swallowing.
    4. Trachea (windpipe)
    5. Cricoid cartilage - firm cartilage ring forming the lower portion of the larynx.
    6. Larynx (voice box)
    7. Bronchi - two major branches of the trachea to the lungs. Bronchus subdivides into smaller air passages ending at the alveoli.
    8. Alveoli
    9. Lungs
    10. Diaphragm
      a. Inhalation (active)
        (1) Diaphragm and intercostal muscles contract, increasing the size of the thoracic cavity.
          (a) Diaphragm moves slightly downward, flares lower portion of rib cage.
          (b) Ribs move upward/outward.
        (2) Air flows into the lungs.
      b. Exhalation
        (1) Diaphragm and intercostal muscles relax, decreasing the size of the thoracic cavity.
          (a) Diaphragm moves upward.
          (b) Ribs move downward/inward.
        (2) Air flows out of the lungs.
    11. Respiratory physiology
      a. Alveolar/capillary exchange
        (1) Oxygen-rich air enters the alveoli during each inspiration.
        (2) Oxygen-poor blood in the capillaries passes into the alveoli.
        (3) Oxygen enters the capillaries, as carbon dioxide enters the alveoli.
      b. Capillary/cellular exchange
        (1) Cells give up carbon dioxide to the capillaries.
        (2) Capillaries give up oxygen to the cells.
      c. Adequate breathing
        (1) Normal Rate

(a) Adult - 12-20/minute
(b) Child - 15-30/minute
(c) Infant - 25-50/minute

(2) Rhythm
(a) Regular
(b) Irregular

(3) Quality
(a) Breath sounds - present and equal
(b) Chest expansion - adequate and equal
(c) Effort of breathing - use of accessory muscles - predominantly in infants and children

(4) Depth (tidal volume) - adequate

d. Inadequate breathing
(1) Rate - outside of normal ranges.
(2) Rhythm - irregular
(3) Quality
(a) Breath sounds - diminished or absent
(b) Chest expansion - unequal or inadequate
(c) Increased effort of breathing - use of accessory muscles - predominantly in infants and children

(4) Depth (tidal volume) - inadequate/shallow
(5) The skin may be pale or cyanotic (blue) and cool and clammy.
(6) There may be retractions above the clavicles, between the ribs and below the rib cage, especially in children.
(7) Nasal flaring may be present, especially in children.
(8) In infants, there may be "seesaw" breathing where the abdomen and chest move in opposite directions.
(9) Agonal breathing (occasional gasping breaths) may be seen just before death.

12. Infant and child anatomy considerations
a. Mouth and nose - in general: All structures are smaller and more easily obstructed than in adults.
(1) Children tend to produce more saliva.
b. Pharynx - infants' and children's tongues take up proportionally more space in the mouth than adults.
c. Trachea (windpipe)
(1) Infants and children have narrower tracheas that are obstructed more easily by swelling.
(2) The trachea is softer and more flexible in infants and children.
d. Cricoid cartilage - like other cartilage in the infant and child, the cricoid cartilage is less developed and less rigid.
e. Diaphragm - chest wall is softer, infants and children tend to

depend more heavily on the diaphragm for breathing.

B. Adequate and inadequate artificial ventilation
   1. An EMT-Basic is adequately artificially ventilating a patient when:
      a. The chest rises and falls with each artificial ventilation.
      b. The rate is sufficient, approximately 12 per minute for adults and 20 times per minute for children and infants.

      NOTE: Heart rate may return to normal with successful artificial ventilation.
   2. Artificial ventilation is inadequate when:
      a. The chest does not rise and fall with artificial ventilation.
      b. The rate is too slow or too fast.

      NOTE: Heart rate may not return to normal with artificial ventilation.

II. Breathing Difficulty
   A. Signs and symptoms
      1. Shortness of breath
      2. Restlessness
      3. Increased pulse rate
      4. Increased breathing rate
      5. Decreased breathing rate
      6. Skin color changes
         a. Cyanotic
         b. Pale
         c. Flushed
         d. Mottled
      7. Noisy breathing
         a. Crowing
         b. Wheezing
         c. Gurgling
         d. Snoring
         e. Stridor
            (1) A harsh sound heard during breathing
            (2) Upper airway obstruction
      8. Silent chest - may be found in Asthma in child & adults
      9. Inability to speak due to breathing efforts.
      10. Retractions - use of accessory muscles.
      11. Shallow or slow breathing may lead to altered mental status (with fatigue or obstruction).
      12. Abdominal breathing (diaphragm only)
      13. Coughing
      14. Irregular breathing rhythm
      15. Patient position
         a. Tripod position
         b. Sitting with feet dangling, leaning forward.
      16. Unusual anatomy (barrel chest)
   B. Emergency Medical Care -

1. Perform initial assessment
2. Perform Focused History and Physical Exam
3. Important questions to ask
    a. **O**nset
    b. **P**rovocation
    c. **Q**uality
    d. **R**adiation
    e. **S**everity
    f. **T**ime
    g. Interventions
4. Breathing
    a. Complains of trouble breathing.
        (1) Apply oxygen if not already done.
        (2) Assess baseline vital signs.
    b. Has a prescribed inhaler available.
        (1) Consult medical direction.
        (2) Facilitate administration of inhaler
            (a) Repeat as indicated.
            (b) Continue focused assessment.
    c. Does not have prescribed inhaler -
        (1) continue with focused assessment.

III. Special Considerations

A. Relationship to Airway Management - should be prepared to intervene with appropriate oxygen administration and artificial ventilation support.

B. Child and Infant consideration - See Module 6

IV. Medications

A. Prescribed inhaler

NOTE: Only Bronchodilators listed below and authorized by the REMAC may be administered. DO NOT ADMINISTER A STEROID BASED INHALER.

1. Medication name
    a. Generic - albuterol, isoetharine, metaproteranol, etc.
    b. Trade - Proventil, Ventolin, Bronkosol, Bronkometer, Alupent, Metaprel, etc.
2. Indications - meets all of the following criteria:
    a. Exhibits signs and symptoms of respiratory emergency,
    b. Has physician prescribed handheld inhaler, and
    c. Administration of medication is authorized by the Regional Medical Advisory Committee.
3. Contraindications
    a. Patient is not alert.
    b. Inhaler is not prescribed for the patient.
4. Medication form - handheld metered dose inhaler
5. Dosage - number of inhalations based upon medical direction's order or physician's order based upon consultation with the patient.

6. Administration
    a. Obtain order from medical direction either on-line or off-line.
    b. Assure right medication, right patient, right route, patient alert enough to use inhaler.
    c. Check the expiration date of the inhaler.
    d. Check to see if the patient has already taken any doses.
    e. Shake the inhaler vigorously several times.
    f. Remove oxygen adjunct from patient.
    g. Have the patient exhale deeply.
    h. Have the patient put his lips around the opening of the inhaler.
    i. Have the patient depress the handheld inhaler as he begins to inhale deeply.
    j. Instruct the patient to hold his breath for as long as he comfortably can (so medication can be absorbed).
    k. Replace oxygen on patient.
    l. Allow patient to breathe a few times. Repeat second dose per protocol.
    m. If patient has a spacer device for use with his inhaler, it should be used. A spacer device is an attachment between inhaler and patient that allows for more effective use of medication.
7. Actions - dilates bronchioles reducing airway resistance.
8. Side effects
    a. Increased pulse rate
    b. Tremors
    c. Nervousness
    d. Nausea
9. Re-assessment strategies
    a. Gather vital signs and focused reassessment.
    b. Patient may deteriorate and need positive pressure artificial ventilation.
10. Infant and child considerations
    a. Use of handheld inhalers is very common in children.
    b. Chest Retractions are more commonly seen in children than adults.
    c. Cyanosis is a late finding in children.
    d. Very frequent coughing may be present rather than wheezing in some children.
    e. Emergency care with usage of handheld inhalers is the same if the indications for usage of inhalers are met by the ill child.

SUGGESTED APPLICATION

Procedural (How)

1. Show students images of adults, children and infants with breathing distress.
2. Show students different types of inhalers.
3. Show students how to use a metered dose inhaler.

Contextual (When, Where, Why)

Very few situations are more frightening to a patient than not being able to breathe. By giving oxygen and helping the patient use his inhaler, the EMT-Basic will be able to relieve a significant amount of the patient's anxiety. The sooner this is done, the better.

STUDENT ACTIVITIES

Auditory (Hear)

1. The student should hear noisy breathing on an audio tape of actual patients.

Visual (See)

1. The student should see signs and symptoms of respiratory emergencies using various audio-visual aids or materials of patients exhibiting the signs.
2. The student should see a demonstration of the proper steps in assisting in the usage of handheld inhalers.

Kinesthetic (Do)

1. The student should practice assessment and management of adult, child and infant patients having a respiratory illness who have been prescribed a handheld inhaler by their physician.
2. The student should practice the steps in facilitating the use of a handheld inhaler.
3. The student should practice role play situations where appropriate and inappropriate assistance of the usage of handheld inhalers occurs.

INSTRUCTOR ACTIVITIES

Supervise student practice.
Reinforce student progress in cognitive, affective, and psychomotor domains.
Redirect students having difficulty with content (complete remediation forms).

EVALUATION

Written: Develop evaluation instruments, e.g., examinations, verbal reviews, handouts, to determine if the students have met the cognitive and affective objectives of this lesson.

Practical: Evaluate the actions of the EMT-Basic students during role play, practice or other skill stations to determine their compliance with

the cognitive and affective objectives and their mastery of the psychomotor objectives of this lesson.

REMEDIATION

Identify students or groups of students who are having difficulty with this subject content. Complete remediation sheet from the instructor's course guide.

SUGGESTED ENRICHMENT

What is unique in the local area concerning this topic? Complete enrichment sheets from the instructor's course guide and attach with lesson plan.

New York State Department of Health
Bureau of Emergency Medical Services
POLICY STATEMENT

Supercedes/Updates: New

No. 00-15

Date: 11/21/00

Re: Storage and safe guarding of medications administered by EMT-Bs.

Purpose

The medications approved for use by EMT-Bs are considered to be a lifesaving measure. As such, care should be taken to allow for immediate access, while safe guarding the medications when not caring for a patient. This policy is developed to address concerns regarding the storage and safe guarding of medications that may be administered in accordance with state and local BLS protocols by EMT-Bs.

Policy

It is recommended that all EMS services carrying medications for use by EMT-Bs develop a policy before placing them into use that includes, but may not be limited to the following items; inventory control, storage and replacement of these items.

In an effort to assist agencies in maintaining control of the medications that may be administered by EMT-Bs, the following should be the minimum requirements implemented by each service providing this level of care.

- The medications must be stored in an environment that protects them from extreme temperature changes and light. According to the medication manufacturer's guidelines, the medications must be stored at temperatures that range from 59 degrees to 77 degrees.[1]
- All medications must be secured in a container or location capable of being secured with a lock or numbered tear-away-type inventory control tag when not being used for patient care.
- The medication must be placed in either a closed ambulance compartment or inside a bag or box that is taken to the patient.
- It is strongly recommended that these medications not be placed in the same locked cabinet with medications, syringes or needles used by

Advanced Life Support Providers.

[1]New Jersey - Drug Adulteration Study, October, 1995

Authorized by: Edward G. Wronski, Director

Send questions or comments to: ems@health.state.ny.us
Revised: February 2001

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