

Idaho Transition Instructional Guidelines
Advanced Emergency Medical Technician
(AEMT-2011)



Preparatory EMS Systems

AEMT Education Standard

Applies fundamental knowledge of the EMS system, safety/well-being of the EMT, and medical/legal and ethical issues to the provision of emergency care.

Transition Highlights

This section includes a more detailed discussion on patient safety issues, decreasing medical error, and required affective/behavioral characteristics.

AEMT-Level Instructional Guideline

The AEMT Instructional Guidelines in this section include all the topics and material at the EMT level PLUS the following material:

- I. IDAPA 16.01.07.075 Standards of Professional Conduct for EMS Personnel
 - 01. Method of Treatment.** EMS personnel must practice medically acceptable methods of treatment and must not endeavor to extend their practice beyond their competence and the authority vested in them by the medical director.
 - 02. Commitment to Self-Improvement.** EMS personnel must continually strive to increase and improve their knowledge and skills and render to each patient the full measure of their abilities.
 - 03. Respect for the Patient.** EMS personnel must provide all services with respect for the dignity of the patient, unrestricted by considerations of social or economic status, personal attributes, or the nature of health problems. (7-1-11)T
 - 04. Confidentiality.** EMS personnel must hold in strict confidence all privileged information concerning the patient except as disclosure or use of this information is permitted or required by law or Department rule. (7-1-11)T
 - 05. Conflict of Interest.** EMS personnel must not accept gratuities for preferential consideration of the patient and must guard against conflicts of interest.
 - 06. Professionalism.** EMS personnel must uphold the dignity and honor of the profession and abide by its ethical principles and should be familiar with existing laws governing the practice of emergency medical services and comply with those laws.
 - 07. Cooperation and Participation.** EMS personnel must cooperate with other health care professionals and participate in activities to promote community and national efforts to meet the health needs of the public.
 - 08. Ethical Responsibility.** EMS personnel must refuse to participate in unethical procedures, and assume the responsibility to expose incompetence or unethical conduct of others to the appropriate authority in a proper and professional manner.
- II. Patient Safety
 - A. Significant – One of The Most Urgent Health Care Challenges
 - B. Incidence-IOM Report “To Err Is Human” Up to 98,000 Patients Die Due to Medical Errors

C. High-Risk Activities

1. Hand off
2. Communication issues
3. Medication issues
4. Airway issues
5. Dropping patients
6. Ambulance crashes
7. Spinal immobilization

D. How Errors Happen

1. Skills based failure
2. Rules based failure
3. Knowledge based failure

E. Preventing Errors

1. Environmental
 - a. Clear protocols
 - b. Light
 - c. Minimal interruptions
 - d. Organization and packaging of drugs
2. Individual
 - a. Reflection in action
 - b. Constantly question assumptions
 - c. Reflection bias
 - d. Use decision aids
 - e. Ask for help

Preparatory Research

AEMT Education Standard

Applies fundamental knowledge of the EMS system, safety/well-being of the AEMT, and medical/legal and ethical issues to the provision of emergency care.

Transition Highlights

This section includes new, limited information on evidence based decision making.

AEMT-Level Instructional Guideline

The AEMT Instructional Guidelines in this section include all the topics and material at the EMT level.

Preparatory Workforce Safety and Wellness

AEMT Education Standard

Applies fundamental knowledge of the EMS system, safety/well-being of the AEMT, and medical/legal and ethical issues to the provision of emergency care.

Transition Highlights

This section includes a brief discussion on safe lifting bariatric issues, neonatal isolettes and medical restraint.

AEMT-Level Instructional Guideline

The AEMT Instructional Guidelines in this section include all the topics and material at the EMT level.

Preparatory Therapeutic Communication

AEMT Education Standard

Applies fundamental knowledge of the EMS system, safety/well-being of the AEMT, medical/legal and ethical issues to the provision of emergency care.

Transition Highlights

This section includes more detailed information about improving communication with the patient.

AEMT-Level Instructional Guideline

The AEMT Instructional Guidelines in this section include all the topics and material at the EMT level PLUS the following material:

- I. Principles of Communicating With Patients in a Manner That Achieves a Positive Relationship
 - A. Dealing With Difficult Patients
 - B. Most Patients Are More Than Willing to Talk
 - 1. Difficult interviews
 - 2. Techniques to use
 - a. Start the interview in the normal manner.
 - b. Attempt to use open-ended questions
 - c. Provide positive feedback
 - d. Make sure the patient understands the questions
 - e. Continue to ask questions
 - 3. Interviewing a hostile patient
 - 4. Hearing impaired patients
 - 5. Patients under the influence of street drugs or alcohol
 - 6. Sexually aggressive patients

Preparatory Medical/Legal and Ethics

AEMT Education Standard

Applies fundamental knowledge of the EMS system, safety/well-being of the AEMT, medical/legal and ethical issues to the provision of emergency care.

Transition Highlights

This section includes new content on HIPPA, Living Wills, Surrogate decision makers and expanded civil and court case content. Additionally, this section should include an Idaho specific discussion on privileged communication.

AEMT-Level Instructional Guideline

The AEMT Instructional Guidelines in this section include all the topics and material at the EMT level.

Anatomy and Physiology

AEMT Education Standard

Applies fundamental knowledge of the anatomy and function of all human systems to the practice of EMS.

Transition Highlights

This section includes more detail than the previous version.

AEMT-Level Instructional Guideline

The AEMT Instructional Guidelines in this section include all the topics and material at the EMT level, PLUS the following material:

I. Anatomy and Body Functions

A. Anatomical Planes

1. Frontal or coronal plane
2. Sagittal or lateral plane
3. Transverse or axial plane

B. Standard Anatomic Terms

C. Body Systems

1. Skeletal

a. Components

- i. skull
- ii. face
- iii. vertebral column
- iv. thorax
- v. pelvis
- vi. upper extremities
- vii. lower extremities

b. Joints

c. Function

2. Muscular

a. Types

- i. skeletal
- ii. smooth
- iii. cardiac

b. Function

D. Respiratory System

1. General function of the respiratory system

a. Upper respiratory tract

b. Lower respiratory tract

2. Structure and functions of the nasal cavities and pharynx

- a. Nasal cavities
 - i. nose
 - ii. nasal cavities
 - iii. nasal septum
 - iv. nasal mucosa
 - v. olfactory receptors
 - vi. paranasal sinuses
- b. Pharynx
 - i. nasopharynx
 - ii. soft palate
 - iii. oropharynx
 - iv. laryngopharynx
- 3. Structure and function of the larynx and the speaking mechanism
 - a. Voice box
 - b. Thyroid cartilage
 - c. Epiglottis
 - d. Vocal cords
 - e. Glottis
- 4. Structure and functions of the trachea and bronchial tree
 - a. Trachea
 - b. Primary bronchi
 - c. Bronchial tree
 - d. Right and left main-stem bronchi
 - e. Bronchioles
- 5. Lungs
 - a. Location and function
 - b. Pleural membranes
 - i. parietal pleura
 - ii. visceral pleura
 - iii. serous fluid
 - c. Hilus
- 6. Structure and function of the alveoli and pulmonary capillaries
- 7. Mechanism of breathing
 - a. Mechanical ventilation
 - i. mechanism of inhalation
 - a) inspiration
 - b) phrenic nerve
 - c) intercostal nerves
 - d) respiration
 - e) ventilation/perfusion disturbance
 - f) diaphragm
 - g) external intercostal muscles
 - h) internal intercostal muscles
 - i) pressures
 - ii. changes in air pressure that occur within the thoracic cavity during respiration
 - a) atmospheric
 - b) intrapleural

- c) intrapulmonic
 - b. Role of the visceral and parietal pleura in respiration
 - c. Mechanics of exhalation
 - 8. Explain the diffusion of gases in external and internal respiration
 - 9. Discuss pulmonary volumes
 - a. Tidal volume
 - b. Minute respiratory volume (MRV)
 - c. Vital capacity
 - 10. Physiological dead space and lung compliance
 - 11. Oxygen and carbon dioxide transport in the blood
 - 12. Nervous and chemical mechanisms that regulate respiration
 - 13. Respiration and acid-base balance
 - a. Respiratory acidosis and alkalosis
 - b. Metabolic acidosis and alkalosis
- E. Circulatory
- 1. Blood
 - a. Composition and function of blood
 - b. Composition and function of blood plasma
 - i. amount
 - ii. color
 - iii. pH
 - iv. viscosity
 - v. plasma
 - c. Primary hemopoietic tissue
 - d. Function of red blood cells
 - e. Red blood cell production in hypoxic state
 - f. Red blood cell and hemoglobin destruction
 - g. ABO group and Rh factor blood types
 - h. Function of white blood cells (leukocytes)
 - i. Platelets
 - 2. The heart
 - a. Location and features of the heart
 - i. mediastinum
 - ii. pericardial membranes
 - iii. fibrous pericardium
 - iv. parietal pericardium
 - v. epicardium
 - b. Chambers of the heart
 - i. myocardium
 - ii. endocardium
 - iii. right and left atria
 - iv. right and left ventricles
 - c. Valves of the heart and their function
 - i. tricuspid valve
 - ii. bicuspid valve (mitral valve)
 - iii. aortic valve
 - iv. pulmonary semilunar valve
 - d. Cardiac cycle

- e. Coronary Arteries
- f. Major blood vessels
- g. Stroke volume, cardiac output, and Starling's law of the heart
- h. Nervous system regulation of the function of the heart
- 3. Blood vessels and circulation
 - a. Structure and function of the blood vessels, arteries, veins and capillaries
 - b. Arterial and venous anastomosis
 - c. Structure of capillaries
 - d. Exchange of gases that occurs at the capillary level
 - e. Mechanism that regulate blood flow through arteries, capillaries, and veins
 - f. Pathway and purpose of the pulmonary circulation
 - g. Pathway of the systemic circulation
 - h. Pathway and purpose of the hepatic portal circulation
 - i. Branches of the aorta and their distributions
 - j. Major systemic arteries and the parts of the body they nourish
 - k. Major systemic veins and the parts of the body they drain of blood
 - l. Hemodynamics
 - i. blood pressure
 - a) venous return
 - b) pulse pressure
 - c) peripheral resistance
 - ii. factors that maintain systemic blood pressure
 - a) heart rate and force of contraction
 - b) vessel elasticity
 - c) blood viscosity
 - d) hormones
 - e) peripheral resistance
 - iii. osmosis
 - iv. diffusion
 - v. facilitated diffusion
 - vi. active transport
 - vii. hydrostatic pressure
 - viii. oncotic pressure
 - m. Regulation of blood pressure by the heart and kidneys
 - n. Medulla and autonomic nervous system regulation of the diameter of the blood vessels
 - o. Coordination of the cardiac, vasomotor, and respiratory centers to control blood flow through the tissues

F. Nervous System

- 1. Structural division
 - a. Central nervous system (CNS)
 - i. brain
 - ii. spinal cord
 - b. Peripheral nervous system (PNS)
- 2. Functional
 - a. Autonomic

- i. sympathetic
 - ii. parasympathetic
 - 3. Functions of the nervous system
 - a. Consciousness
 - i. cerebral hemispheres
 - ii. reticular activating system (center of consciousness)
 - b. Sensory function
 - c. Motor function
 - d. Fight-or-flight response
- G. Integumentary (Skin)
 - 1. Structures
 - a. Epidermis
 - b. Dermis
 - c. Subcutaneous layer
 - 2. Functions of the skin
 - a. Protection
 - b. Temperature control
- H. Digestive System
 - 1. Structures
 - a. Esophagus
 - b. Stomach
 - c. Intestines
 - d. Liver
 - e. Pancreas
- I. Endocrine System
 - 1. Structures
 - a. Pancreas
 - b. Adrenal glands
 - i. epinephrine
 - ii. norepinephrine
 - 2. Function
 - a. Control of blood glucose level
 - b. Stimulate sympathetic nervous system
- J. Renal System
 - 1. Structures
 - a. Kidneys
 - b. Bladder
 - c. Urethra
 - 2. Function
 - a. Blood filtration
 - b. Fluid balance
 - c. Buffer
- K. Reproductive System
 - 1. Male
 - a. Structures
 - i. testicles
 - ii. penis
 - b. Functions

- i. reproduction
 - ii. urination
 - iii. hormones
- 2. Female
 - a. Structures
 - i. ovaries
 - ii. fallopian tubes
 - iii. uterus
 - iv. vagina
 - b. Functions
 - i. reproduction
 - ii. hormones

II. Life Support Chain

A. Fundamental Elements

- 1. Oxygenation
 - a. Alveolar/capillary gas exchange
 - b. Cell/capillary gas exchange
- 2. Perfusion
 - a. Oxygen
 - b. Glucose
 - c. Removal of carbon dioxide and other waste products
- 3. Cell environment
 - a. Aerobic metabolism
 - i. high atp (energy) production
 - ii. byproduct of water and carbon dioxide
 - b. Anaerobic metabolism
 - i. low atp (energy) production
 - ii. byproduct of lactic acid

B. Issues Affecting Fundamental Elements

- 1. Composition of ambient air
- 2. Patency of the airway
- 3. Mechanics of ventilation
- 4. Regulation of respiration
- 5. Ventilation/perfusion ratio
- 6. Transport of gases
- 7. Blood volume
- 8. Effectiveness of the heart as a pump
- 9. Vessel size and resistance (systemic vascular resistance)
- 10. Effects of acid on cells and organs

III. Age-Related Variations for Pediatrics and Geriatrics

A. See Special Patient Populations

Pathophysiology

AEMT Education Standard

Applies comprehensive knowledge of the pathophysiology of respiration and perfusion to patient assessment and management.

Transition Highlights

This section includes content that is new to this level but only focuses on respiratory and perfusion dysfunction along with shock.

AEMT-Level Instructional Guideline

The AEMT Instructional Guidelines in this section include all the topics and material at the EMT level, PLUS the following material:

I. Alteration in Cells and Tissues

II. Cellular Injury

A. Hypoxic Injury - Causes

1. Decreased oxygenation
2. Loss of hemoglobin or hemoglobin function
3. Decreased red blood cells
4. Respiratory or cardiovascular system disease

III. Hypoperfusion

A. Pathogenesis

1. Decreased cardiac output
2. Compensatory mechanisms
 - a. Catecholamine release
 - i. epinephrine
 - ii. norepinephrine
 - iii. increase in systemic vascular resistance
 - a) increased blood volume
 - b) vasoconstriction
 - v. increased heart rate
 - vi. increased preload
3. Oxygen impairment
 - a. Anaerobic metabolism
 - b. Increased lactate
 - c. Metabolic acidosis
 - i. decreased oxygen affinity for hemoglobin
 - ii. decreased atp
 - iii. changes in cellular electrolytes
 - iv. cellular edema
 - v. release of lysosomal enzymes

d. Impaired glucose use

B. Types of Shock

1. Cardiogenic shock
 - a. Defined
 - b. Pathophysiology
 - c. Evaluation and treatment
2. Hypovolemic shock
 - a. Defined
 - b. Pathophysiology
 - c. Evaluation and treatment
3. Neurogenic shock
 - a. Defined
 - b. Pathophysiology
 - c. Evaluation and treatment
4. Anaphylactic shock
 - a. Defined
 - b. Pathophysiology
 - c. Evaluation and treatment
5. Septic shock
 - a. Defined
 - b. Pathophysiology
 - c. Evaluation and treatment

Life Span Development

AEMT Education Standard

Applies fundamental knowledge of life span development to patient assessment and management.

Transition Highlights

This section includes new content.

AEMT-Level Instructional Guideline

The AEMT Instructional Guidelines in this section include all the topics and material at the EMT level.

Pharmacology

Principles of Pharmacology

AEMT Education Standard

Applies (to patient assessment and management) fundamental knowledge of the medications carried by AEMTs that may be administered to a patient during an emergency.

Transition Highlights

This section contains new information.

AEMT-Level Instructional Guideline

The AEMT Instructional Guidelines in this section include all the topics and material at the EMT level PLUS the following material:

I. Medication Safety

II. Medication Legislation

- A. Pure Food and Drug Act
- B. Federal Food, Drug and Cosmetic Act
- C. Harrison Narcotic Act
- D. Controlled Substances Act
- E. Drug Enforcement Agency
- F. Development of Pharmaceuticals
 - 1. Food and Drug Administration approval process
 - 2. Special Considerations
 - a. Pregnancy
 - b. Pediatrics
 - c. Geriatrics
- G. Drug Forms
 - 1. Liquids
 - 2. Solids
 - 3. Gases

III. Naming

- A. Chemical
- B. Generic
- C. Propriety/Trade
- D. Official
- E. Authoritative Sources of Drug Information
 - 1. United States Pharmacopeia (USP)
 - 2. Physician's Desk Reference (PDR)
 - 3. Drug package inserts

4. Drug handbooks

IV. Classifications

A. Body System Affected

B. Class of Agent

C. Classifications by Body System

1. Central nervous system

a. Autonomic pharmacology

i. cholinergics

ii. anticholinergic drug definitions

iii. adrenergics

iv. antiadrenergic

a) alpha – adrenergic blockers

b) beta – adrenergic blockers

b. Analgesics

i. opioid agonists

ii. opioid antagonists

iii. non steroidal anti – inflammatory drugs

c. Sedative/hypnotic

i. benzodiazepines

ii. barbiturates

d. Anticonvulsants

e. Stimulants

2. Cardiovascular drug definitions

a. Anti-dysrhythmics

b. Cardiac glycosides

c. Antihypertensives

d. Antianginal drugs

3. Drugs affecting the blood

4. Psychiatric medications

5. Respiratory system

a. Mucolytics

b. Cholinergic antagonists

c. Sympathomimetics

d. Xanthine derivatives

e. Antihistamines

6. Endocrine system -- drugs affecting the pancreas

a. Insulin preparations

b. Oral hypoglycemic agents

c. Hyperglycemic agents

7. Herbal preparations

a. Potential Implications

i. interaction with pharmaceuticals

ii. idiosyncratic reactions

iii. manufacturing error

iv. contamination

v. substitution

b. Adulteration

- i. incorrect preparation
 - ii. incorrect labeling
- 8. Over the counter medications
 - a. Drugs affecting the central nervous system
 - i. sedatives
 - ii. stimulants
 - iii. hallucinogenic (dextromethorphan)
 - b. Drugs affecting the respiratory system
 - i. asthma treatment products
 - ii. cold and allergy products
 - c. Supplements
 - i. herbs
 - ii. vitamins
 - iii. minerals
 - iv. other

V. Storage and Security

A. Factors Affecting Drug Potency

- 1. Temperature
- 2. Light
- 3. Moisture
- 4. Shelf Life

B. Locking and Double Locking of Medications

VI. Drug Terminology

- A. Antagonism
- B. Bolus
- C. Contraindications
- D. Cumulative Action
- E. Depressant
- F. Habituation
- G. Hypersensitivity
- H. Idiosyncrasy
- I. Indication
- J. Potentiation
- K. Refractory
- L. Side Effects
- M. Stimulant
- N. Synergism
- O. Therapeutic Action
- P. Tolerance
- Q. Untoward Effect

VII. Pharmacological Concepts

- A. Pharmacokinetics
 - 1. Absorption
 - 2. Distribution
 - 3. Biotransformation

4. Metabolism and Excretion -- organs of elimination
 - a. kidneys
 - b. intestine
 - c. lungs
 - d. exocrine glands
- B. Pharmacodynamics
 1. Mechanism of action
 - a. Drug receptor interaction
 - i. agonists
 - ii. antagonists
 - iii. affinity
 - iv. efficacy
 - b. Drug enzyme interaction
 2. Medication response relationship
 - a. Plasma levels
 - b. Biologic half-life
 - c. Therapeutic threshold
 - d. Therapeutic index
 - e. LD 50
 - f. Factors altering drug response
 - i. age
 - ii. sex
 - iii. body mass index
 - iv. pathologic state
 - v. genetic factors
 - vi. time of administration
 - vii. psychological factors
 - viii. predictable responses
 - a) tolerance
 - b) cross tolerance
 - ix. iatrogenic responses\
 - x. drug allergy
 - xi. anaphylactic reaction
 - xii. delayed reaction ("serum sickness")
 - xiii. hypersensitivity
 - xiv. idiosyncrasy
 - xv. cumulative effect
 - xvi. drug dependence
 - xvii. drug antagonism
 - xviii. summation (addition or additive effect)
 - xix. synergism
 - xxi. interference
 3. Medication interaction
 4. Toxicity

Pharmacology

Medication Administration

AEMT Education Standard

Applies (to patient assessment and management) fundamental knowledge of the medications carried by AEMTs that may be administered to a patient during an emergency.

Transition Highlights

This section added the five rights of medication administration and includes more detailed information.

AEMT-Level Instructional Guideline

The AEMT Instructional Guidelines in this section include all the topics and material at the EMT level PLUS the following material:

- I. Administration of Medication to a Patient
 - A. The “Rights” of Drug Administration
 1. Right patient – prescribed to patient
 2. Right medication – patient condition
 3. Right route – patient condition
 4. Right dose – prescribed to patient
 5. Right time – within expiration date

Pharmacology

Emergency Medications

AEMT Education Standard

Applies (to patient assessment and management) fundamental knowledge of the medications carried by AEMTs that may be administered to a patient during an emergency.

Transition Highlights

This section includes specific list of medications.

AEMT-Level Instructional Guideline

The AEMT Instructional Guidelines in this section include all the topics and material at the EMT level PLUS the following material:

The AEMT must know (to a fundamental depth) the names, mechanism of action, indications, contraindications, complications, routes of administration, side effects, interactions, dose, and any specific administration considerations, for all of the following emergency medications and intravenous fluids. Individual training programs have the authority to add any medication used locally by AEMTs.

I. Specific Medications

- A. Albuterol
- B. Aspirin
- C. Dextrose (50%)
- D. Epinephrine (Intramuscular or Subcutaneous)
- E. Glucagon
- F. Glucose
- G. Intravenous Fluids
 - 1. Dextrose 5% in water
 - 2. Normal Saline
 - 3. Lactated Ringer's
- H. Naloxone
- I. Nitroglycerin
 - 1. Paste
 - 2. Spray
 - 3. Tablets
- J. Oxygen
- K. Nitrous Oxide

II. Special Considerations in Pediatrics and Geriatrics

- A. Routes of Administration
- B. Dosages
- C. Dilutions
- D. Pharmacokinetic Alterations

Airway Management, Respiration, and Artificial Ventilation

Airway Management

AEMT Education Standard

Applies knowledge (fundamental depth, foundational breadth) of upper airway anatomy and physiology to patient assessment and management in order to assure a patent airway, adequate mechanical ventilation, and respiration for patients of all ages.

Transition Highlights

This section includes more detailed content.

AEMT-Level Instructional Guideline

The AEMT Instructional Guidelines in this section include all the topics and material at the EMT level PLUS the following material:

- I. Airway Anatomy
 - A. Sinuses
 - B. Upper Airway Tract
 - 1. Nose
 - a. Warm and humidify air
 - b. Turbinate
 - 2. Mouth and Oral Cavity
 - a. Lips
 - b. Teeth
 - c. Tongue
 - d. Soft Palate -- Uvula
 - e. Tonsils and Adenoids
 - 3. Jaw
 - a. Facial Bones
 - i. maxilla
 - ii. mandible
 - 4. Pharynx
 - a. Nasopharynx
 - b. Oropharynx
 - c. Hypopharynx
 - d. Laryngopharynx
 - 5. Larynx
 - a. Cartilages
 - i. epiglottis
 - ii. arytenoid cartilages
 - iii. vocal cords
 - iv. thyroid cartilage
 - v. cricoid ring

- b. Bone
- C. Jugular Notch
- D. Lower Airway Tract
 - 1. Trachea
 - 2. Carina
 - 3. Bronchi
 - 4. Lungs
 - a. Bronchioles
 - i. bronchial smooth muscle
 - ii. beta 2 adrenergic receptors
 - b. Pulmonary cilia
 - c. Alveoli
- E. Support Structures
 - 1. Chest Cage
 - a. Ribs
 - b. Muscles of respiration
 - i. intercostal muscles
 - ii. diaphragm
 - c. Pleura
 - i. parietal pleura
 - ii. visceral pleura
 - 2. Phrenic nerve
 - 3. Mediastinum

II. Airway Assessment

- A. Purpose
 - 1. Identify inadequate airway
 - 2. Identify an unstable airway
 - 3. Identify potentially difficult airways
- B. Procedure
 - 1. Gag Reflex
 - 2. Airway obstruction
 - a. Soft tissue obstruction
 - b. Foreign bodies
 - c. Complete and incomplete
 - d. Upper vs. Lower
 - 3. Work of breathing
 - 4. Laryngospasm
 - 5. Laryngeal edema
 - 6. Penetrating injuries

III. Techniques of Assuring a Patent Airway

- A. Manual Airway Maneuvers
- B. Mechanical Airway Devices
- C. Relief of Foreign Body Airway Obstruction (Refer to Current American Heart Association Guidelines)
- D. Upper Airway Suctioning

1. Review and elaborate on the upper airway suctioning material from the EMR and EMT levels
 2. Procedure for lower airway suctioning of the previously intubated patient
 - a. Purpose
 - b. Indications
 - c. Contraindications
 - d. Complications
 - e. Procedure
 - f. Limitation
- E. Blind Insertion Airway Devices
1. Esophageal obturation (e.g., Combitube, PTL, Easytube, King LTD)
 - a. Purpose
 - b. Indications
 - c. Contraindications
 - d. Complications
 - e. Procedure (including confirmation techniques)
 2. Supraglottic devices (e.g., LMA, COBRA)
 - a. Purpose
 - b. Indications
 - c. Contraindications
 - d. Complications
 - e. Procedure (including confirmation techniques)

IV. Consider Age-Related Variations in Pediatric and Geriatric Patients

Airway Management, Respiration, and Artificial Ventilation

Respiration

AEMT Education Standard

Applies knowledge (fundamental depth, foundational breadth) of upper airway anatomy and physiology to patient assessment and management in order to assure a patent airway, adequate mechanical ventilation, and respiration for patients of all ages.

Transition Highlights

This section includes more detail of minimal new content.

AEMT-Level Instructional Guideline

The AEMT Instructional Guidelines in this section include all the topics and material at the EMT level PLUS the following material:

- I. Anatomy of the Respiratory System
 - A. Includes All Airway Anatomy Covered in the Airway Management Section
 - B. Additional Respiratory System Anatomy
 - C. Chest Cage
 - 1. Ribs
 - 2. Muscles of respiration
 - a. Intercostal muscles
 - b. Diaphragm
 - 3. Pleura
 - a. Parietal pleura
 - b. Visceral pleura
 - D. Phrenic Nerve
 - E. Mediastinum
- II. Physiology of Respiration
 - A. Mechanics of Respiration
 - 1. Pulmonary ventilation
 - a. Movement of the thoracic wall
 - b. Intrathoracic pressure gradients
 - c. Phases of ventilation
 - i. active phase
 - ii. passive phase
 - d. Lung volumes and capacities
 - i. volumes
 - a) tidal volume
 - b) minute volume
 - c) residual volume
 - d) dead space volume

- ii. capacities
 - a) vital capacity
 - iii. maximum inspiratory force
 - iv. maximum expiratory force
 - v. significance of pulmonary volumes and capacities
 - 2. Gas exchange
 - 3. Oxygenation
 - 4. Respiration
 - a. External
 - b. Internal
 - c. Cellular
 - 5. Lung compliance

III. Pathophysiology of Respiration

A. Pulmonary Ventilation

- 1. Interruption of nervous control
 - a. Drugs
 - b. Trauma
 - c. Muscular dystrophy
- 2. Structural damage to the thorax
- 3. Bronchoconstriction
- 4. Disruption of airway patency
 - a. Infection
 - b. Trauma/burns
 - c. Foreign body obstruction
 - d. Allergic reaction
 - e. Unconsciousness (loss of muscle tone)

B. Oxygenation

C. Respiration

- 1. External
 - a. Deficiencies due to altitude
 - b. Deficiencies due to closed environments
 - c. Deficiencies due to toxic or poisonous environments
- 2. Internal
 - a. Pathology typically related to changes in alveolar - capillary gas exchange
 - b. Typical disease processes
 - i. emphysema
 - ii. pulmonary edema
 - iii. pneumonia
 - iv. environmental/occupational exposure
 - v. drowning
- 3. Cellular

IV. Assessment of Adequate and Inadequate Respiration

V. Management of Adequate and Inadequate Respiration

A. Respiratory Compromise

1. Assure an adequate airway
2. Review supplemental oxygen therapy
3. Assisted positive pressure ventilations
 - a. Purpose/definition
 - b. Indications
 - c. Contraindications
 - d. Complications
 - e. Procedure

VI. Supplemental Oxygen Therapy

A. Review of Oxygen Delivery Devices Used by EMTs

1. Purpose
2. Indications
3. Contraindications
4. Complications
5. Procedures

VII. Age-Related Variations in Pediatric and Geriatric Patients

Airway Management, Respiration, and Artificial Ventilation

Artificial Ventilation

AEMT Education Standard

Applies knowledge (fundamental depth, foundational breadth) of upper airway anatomy and physiology to patient assessment and management in order to assure a patent airway, adequate mechanical ventilation, and respiration for patients of all ages.

Transition Highlights

This section includes increased level of detail.

AEMT-Level Instructional Guideline

The AEMT Instructional Guidelines in this section include all the topics and material at the EMT level PLUS the following material:

I. Comprehensive Ventilation Assessment

- A. Purpose
- B. Procedure
- C. Minute Volume
- D. Alveolar Volume
- E. Evaluating the Effects of Artificial Ventilation
- F. Pulse Oximetry
 - 1. purpose
 - 2. Indications
 - 3. Contraindications
 - 4. Complications
 - 5. Procedure

II. The Management of Inadequate Ventilation

- A. Assure an Adequate Airway
- B. Supplemental Oxygen Therapy
- C. Artificial Ventilation Devices
 - 1. Bag-valve-mask with reservoir
 - a. Advantages
 - b. Disadvantages
 - 2. Manually triggered ventilation device
 - a. Advantages
 - i. allows a single rescuer to use both hands to maintain a mask-to-face seal while providing positive pressure ventilation to a patient.
 - ii. reduces rescuer fatigue during extended transport times
 - b. Disadvantages
 - i. difficult to maintain adequate ventilation without assistance

- ii. requires oxygen however, typical adult ventilation consumes 5 liters per minute O₂ versus 15 –25 liters per minute for a bag-valve-mask.
- iii. typically used on adult patients only
- iv. requires special unit and additional training for use in pediatric patients
- v. the rescuer is unable to easily assess lung compliance.
- vi. high ventilatory pressures may damage lung tissue.

3. Automatic Transport Ventilator/Resuscitator

a. Advantages

b. Disadvantages

- i. requires oxygen however, typical adult ventilation consumes 5 liters per minute O₂ versus 15 –25 liters per minute for a bag-valve-mask.
- ii. may require an external power source
- iii. must have bag-valve-mask device available
- iv. may interfere with timing of chest compressions during CPR
- v. must monitor to assure full exhalation
- vi. barotrauma

D. Ventilation of an Apneic Patient

1. Purpose
2. Indications
3. Contraindications
4. Procedure

E. Ventilation of the Protected Airway

1. Purpose
2. Indications
3. Contraindications
4. Complications
5. Procedure

III. The Differences Between Normal and Positive Pressure Ventilation

A. Air Movement

1. Normal ventilation
 - a. Negative intrathoracic pressure
 - b. Air is sucked into lungs
2. Positive pressure ventilation

B. Blood Movement

1. Normal ventilation
 - a. Blood return from the body happens naturally
 - b. Blood is pulled back to the heart during normal breathing
2. Positive pressure ventilation
 - a. Venous return is decreased during lung inflation
 - b. Amount of blood pumped out of the heart is reduced.

C. Airway Wall Pressure

1. Normal ventilation
2. Positive pressure ventilation
 - a. Walls are pushed out of normal anatomical shape

- b. More volume is required to have the same effect as normal breathing
- D. Esophageal Opening Pressure
 - 1. Normal ventilation
 - 2. Positive pressure ventilation
 - a. Air is pushed into the stomach during ventilation
 - b. Gastric distention may lead to vomiting
- E. Over Ventilation (Either by Rate or Volume) Can Be Detrimental to the Patient
 - 1. Hypotension
 - 2. Gastric distention
 - 3. Other unintended consequences

IV. Consider Age-Related Variations in Pediatric and Geriatric Patients

Patient Assessment Scene Size-Up

AEMT Education Standard

Applies scene information and patient assessment findings (scene size-up, primary and secondary assessment, patient history, reassessment) to guide emergency management.

Transition Highlights

This section includes re-emphasis on scene safety.

AEMT-Level Instructional Guideline

The AEMT Instructional Guidelines in this section include all the topics and material at the EMT level.

Patient Assessment

Primary Assessment

AEMT Education Standard

Applies scene information and patient assessment findings (scene size-up, primary and secondary assessment, patient history, reassessment) to guide emergency management.

Transition Highlights

This section includes new terminology that more closely mimics other health care professionals.

AEMT-Level Instructional Guideline

The AEMT Instructional Guidelines in this section include all the topics and material at the EMT level PLUS the following material:

I. Primary Survey/Primary Assessment

A. Initial General Impression – Based on the Patient’s Age-Appropriate Appearance

1. Appears stable
2. Appears stable but potentially unstable
3. Appears unstable

B. Level of Consciousness

1. Alert
2. Responds to verbal stimuli.
3. Responds to painful stimuli.
4. Unresponsive - no gag or cough

C. Airway Status

1. Unresponsive patient
 - a. Open the airway.
 - b. Clear any obstructions
2. Responsive patient - Is the patient talking or crying?
 - a. If yes, assess for adequacy of breathing
 - b. If no, open airway

D. Breathing Status

1. Patient responsive
 - a. Breathing is adequate (rate and quality)
 - b. Breathing is too fast (> 24 breaths per minute)
 - c. Breathing is too slow (<8 breaths per minute)
 - d. Breathing absent (choking)
2. Patient unresponsive
 - a. Breathing is adequate (rate and quality)
 - b. Breathing is inadequate
 - c. Breathing is absent

E. Circulatory Status

1. Radial pulse present (rate and quality)
 - a. Normal rate
 - b. Fast
 - c. Slow
 - d. Irregular rate
 2. Radial pulse absent
 3. Assess if major bleeding is present
 4. Perfusion status
 - a. Skin color
 - b. Skin temperature
 - c. Skin moisture
 - d. Capillary refill (as appropriate)
- F. Identify Life Threats
- G. Assessment of Vital Functions

II. Integration of Treatment/Procedures Needed to Preserve Life

III. Evaluating Priority of Patient Care and Transport

- A. Primary Assessment: Stable
- B. Primary Assessment: Potentially Unstable
- C. Primary Assessment: Unstable

Patient Assessment History-Taking

AEMT Education Standard

Applies scene information and patient assessment findings (scene size-up, primary and secondary assessment, patient history, reassessment) to guide emergency management.

Transition Highlights

This section includes new terminology.

AEMT-Level Instructional Guideline

The AEMT Instructional Guidelines in this section include all the topics and material at the EMT level.

Patient Assessment

Secondary Assessment

AEMT Education Standard

Applies scene information and patient assessment findings (scene size-up, primary and secondary assessment, patient history, reassessment) to guide emergency management

Transition Highlights

This section includes new terminology and an increased level of detail.

AEMT-Level Instructional Guideline

The AEMT Instructional Guidelines in this section include all the topics and material at the EMT level PLUS the following material:

I. Techniques of Physical Examination

II. Assessment of Lung Sounds

A. Expose the Chest as Appropriate for the Environment

B. Auscultation

1. Technique

- a. Medical versus trauma
- b. Anterior chest

2. Lung sounds

- a. Vesicular
- b. Bronchovesicular
- c. Bronchial sounds
- d. Adventitious sounds
- e. Absence of breath sounds

3. Inspiratory versus expiratory phase

III. Special Considerations for Pediatric and Geriatric Patients

A. Normal Vital Signs by Age

B. See Special Patient Populations section

Patient Assessment Monitoring Devices

AEMT Education Standard

Applies scene information and patient assessment findings (scene size-up, primary and secondary assessment, patient history, reassessment) to guide emergency management.

Transition Highlights

This section includes new content for blood glucose monitoring and blood chemistry analysis.

AEMT-Level Instructional Guideline

The AEMT Instructional Guidelines in this section include all the topics and material at the EMT level PLUS the following material:

I. Blood Glucose Determination

A. Purpose

1. Assess blood glucose level
2. Assess impact of interventions

B. Indications

1. Decreased level of consciousness in the suspected diabetic
2. Decreased level of consciousness of unknown origin

C. Procedure

1. Cleaning the site
2. Refer to manufacturer's instructions for device being used
3. Disposal of sharps

D. Limitations

1. Lack of calibration
2. Venous versus Capillary sampling

E. Interpretation (see Medical Emergencies: Endocrine)

II. Other Monitoring Devices

- A. As additional monitoring devices become recognized as the "standard of care" in the out-of-hospital setting, those devices should be incorporated into the primary education of those who will be expected to use them in practice
- B. State regulatory processes may elect to expand, delete, or modify from the monitor devices in this section

Patient Assessment Reassessment

AEMT Education Standard

Applies scene information and patient assessment findings (scene size-up, primary and secondary assessment, patient history, reassessment) to guide emergency management.

Transition Highlights

Review.

AEMT-Level Instructional Guideline

The AEMT Instructional Guidelines in this section include all the topics and material at the EMT level.

Medicine Neurology

AEMT Education Standard

Applies fundamental knowledge to provide basic emergency care and transportation based on assessment findings for an acutely ill patient.

Transition Highlights

This section includes more detailed information on stroke assessment and management.

AEMT-Level Instructional Guideline

The AEMT Instructional Guidelines in this section include all the topics and material at the EMT level PLUS the following material:

I. Stroke/TIA

A. Causes

1. Hemorrhage
2. Clot

B. Review of Anatomy and Function of the Brain and Cerebral Blood Vessels

C. Assessment Findings and Symptoms

1. Confused, dizzy, weak
2. Decreasing or increasing level of consciousness
3. Combative or uncooperative or restless
4. Facial drooping, inability to swallow, tongue deviation
5. Double vision or blurred vision
6. Difficulty speaking or absence speech
7. Decreased or absent movement of one or more extremities
8. Headache
9. Decreased or absent sensation in one or more extremities or other areas of body
10. Coma

D. Stroke Alert Criteria

1. Cincinnati Prehospital Stroke Scale
2. Other stroke scales

E. Management of Patient With Stroke Assessment Findings or Symptoms

F. Scene Safety and Standard Precautions

1. ABCs /position
2. Oxygen/suction
3. Pulse oximetry
4. Emotional support
5. Rapid transport

G. Transient Ischemic Attack (TIA)

Medicine

Immunology

AEMT Education Standard

Applies fundamental knowledge to provide basic and selected advanced emergency care and transportation based on assessment findings for an acutely ill patient.

Transition Highlights

This section includes minimal new content.

AEMT-Level Instructional Guideline

The AEMT Instructional Guidelines in this section include all the topics and material at the EMT level PLUS the following material:

I. Define Acute Abdomen

II. Anatomy of the Organs of the Abdominopelvic Cavity

- A. Stomach
- B. Intestines
- C. Esophagus
- D. Spleen
- E. Urinary Bladder
- F. Liver
- G. Gall Bladder
- H. Pancreas
- I. Kidney
- J. Reproductive Organs

III. Assessment and Symptoms

- A. Techniques
 - 1. Inspection
 - 2. Palpation
- B. Normal Findings—Soft Non-Tender
- C. Abnormal Findings
 - 1. Nausea/vomiting
 - a. Excessive
 - b. Hematemesis
 - 2. Change in bowel habits/stool
 - a. Constipation
 - b. Diarrhea
 - c. Dark tarry stool
 - 3. Urination
 - a. Pain

- b. Frequency
- c. Color
- d. Odor
- 4. Weight loss
- 5. Belching/flatulence
- 6. Concurrent chest pain
- 7. Pain, tenderness, guarding, distension
- 8. Other

IV. General Management for Patients With an Acute Abdomen

- A. Scene Safety and Standard Precautions
- B. Airway, Ventilatory and Circulation
- C. Position
- D. Emotional Support

V. Specific Acute Abdominal Conditions—Definition, Causes, Assessment Findings and Symptoms, Complications, and Specific Prehospital Management.

- A. Acute and Chronic Gastrointestinal Hemorrhage
- B. Peritonitis
- C. Ulcerative Diseases

VI. Consider Age-Related Variations for Pediatric and Geriatric Assessment and Management

VII. Pediatrics

- A. Anatomic and Physiologic Differences in Children
- B. Pathophysiology
- C. Assessment
 - 1. History
 - 2. Physical findings
 - a. Vomiting causes dehydration
 - b. Appendicitis common in children
 - c. Abdominal pain from constipation
 - d. Vomiting
 - e. GI Bleeding
 - 3. Management

D. Geriatric

- 1. May not exhibit rigidity or guarding
- 2. Abdominal pain related to cardiac conditions

VIII. Communication and Documentation for Patients With an Abdominal or Gastrointestinal Condition or Emergency

IX. Transport Decisions

Medicine

Immunology

AEMT Education Standard

Applies fundamental knowledge to provide basic and selected advanced emergency care and transportation based on assessment findings for an acutely ill patient.

Transition Highlights

This section includes all new content.

AEMT-Level Instructional Guideline

The AEMT Instructional Guidelines in this section include all the topics and material at the EMT level PLUS the following material:

I. Introduction

- A. Definition of Terms
 - 1. Allergic reaction
 - 2. Anaphylaxis
- B. Risk Factors and Common Allergens

II. Basic Immune System's Response to Allergens

- A. The Purpose of the Response
- B. The Type of Response (Local versus Systemic)
- C. The Speed of the Response

III. Pathophysiology

- A. Allergic Reaction
 - 1. Antigens
 - 2. Antibodies
 - 3. Mast cells and basophils
 - 4. Histamine, leukotrienes, and other mediators
 - 5. Local reactions
 - 6. Reactions

IV. Assessment

- A. Mild Allergic Reaction
 - 1. Cutaneous
 - 2. Other
- B. Moderate Allergic Reaction
 - 1. Upper airway
 - 2. Lower airway
 - 3. Cardiovascular
 - 4. Cutaneous

- 5. Gastrointestinal
- 6. Neurological
- C. Severe Allergic Reaction/Anaphylaxis
 - 1. Upper airway
 - 2. Lower airway
 - 3. Cardiovascular
 - 4. Cutaneous
 - 5. Gastrointestinal
 - 6. Neurological

V. Managing Anaphylaxis

- A. Provide Treatment Specific to Assessment Findings and Severity of Reaction
- B. Remove Allergen If Possible
- C. Protect the Airway
- D. Oxygenate the Patient
- E. Ventilate If Needed
 - 1. Apneic patient
 - 2. Dyspneic patient
 - 3. Patient with airway edema
- F. Medication Administration
 - 1. Epinephrine administration
 - 2. Bronchodilation
- G. Fluid Administration

VI. Age-Related Considerations

- A. Pediatric Epinephrine Dosing
- B. Use of Epinephrine in the Geriatric Patient

Medicine

Infectious Disease

AEMT Education Standard

Applies fundamental knowledge to provide basic and selected advanced emergency care and transportation based on assessment findings for an acutely ill patient.

Transition Highlights

This section includes updated infectious disease information, for example methicillin-resistant *Staphylococcus aureus* (MRSA), hepatitis, and Acquired Immune Deficiency Syndrome (AIDS) update; should include a discussion on cleaning and sterilizing equipment and decontaminating the ambulance.

AEMT-Level Instructional Guideline

The AEMT Instructional Guidelines in this section include all the topics and material at the EMT level PLUS the following material:

- I. Standard Precautions, Personal Protective Equipment, and Cleaning and Disposing of Equipment and Supplies
 - A. Principles of Standard Precautions
 - B. Hand Washing Guidelines
 - C. Recommendations for Personal Protective Equipment
 - D. Recommendations for Cleaning or Sterilization of Equipment
 - E. Recommendations for Disposing of Contaminated Linens and Supplies Including Sharps
 - F. Recommendations for Decontaminating the Ambulance

- II. Specific Diseases and Conditions
 - A. HIV and AIDS
 1. Incidence, morbidity, mortality, risk factors, modes of transmission
 2. Pathophysiology
 3. Body systems affected
 4. Progression of disease including opportunistic infections
 5. Healthcare worker susceptibility and transmission
 6. Assessment findings and symptoms
 - a. Often asymptomatic
 - b. Non-specific febrile illness
 - c. Sore throat, fatigue
 - d. Swollen spleen and lymph glands
 - e. Weight loss
 - f. Opportunistic infections
 7. Management for a patient with HIV or AIDS-related conditions
 - a. Prehospital care is supportive
 - b. Manage airway and support ventilation

- c. IV if needed
 - d. Respiratory isolation if coughing
 - 8. Immunization and treatment of exposure
- B. Hepatitis
 - 1. Introduction--Pathophysiology, incidence, types, causes, risk factors, methods of transmission, complications
 - 2. General assessment findings and symptoms
 - a. Asymptomatic
 - b. Non-specific febrile illness
 - c. Light-colored stools
 - d. Dark urine
 - e. Fatigue
 - f. Nausea/vomiting
 - g. Abdominal pain/tenderness
 - h. Jaundice
 - i. Fulminant acute hepatitis
 - 3. Treatments for exposure/prevention; immunizations
 - 4. Types
 - a. Hepatitis A
 - b. Hepatitis B
 - c. Hepatitis C
 - d. Hepatitis D
 - e. Hepatitis E
 - f. Hepatitis G
 - g. Other
 - 5. Management for a patient with hepatitis
 - a. Prehospital care is supportive
 - b. Manage airway and support ventilation
 - c. IV if needed

Medicine

Endocrine Disorders

AEMT Education Standard

Applies fundamental knowledge to provide basic and selected advanced emergency care and transportation based on assessment findings for an acutely ill patient.

Transition Highlights

This section includes increased level of detail on diabetes.

AEMT-Level Instructional Guideline

The AEMT Instructional Guidelines in this section include all the topics and material at the EMT level PLUS the following material:

I. Diabetic Emergencies

- A. Related Anatomy of the Pancreas and Organs Supporting Blood Sugar Regulation
- B. Physiology of the Pancreas
- C. Hormones Related to Blood Sugar Regulation
- D. Pathophysiology of Diabetes Mellitus
 - 1. Long-term complications
 - 2. Types of diabetes
 - a. Type I
 - b. Type II
 - c. Gestational
- E. Drugs to Manage Diabetes
 - 1. Insulins
 - a. types
 - b. delivery methods
 - 2. Oral antihyperglycemics

II. Assessment

- A. Impact of Disease on Prehospital Assessment
- B. Alterations of Findings in Long-Term Diabetics
- C. Hypoglycemia
 - 1. Physical findings
 - 2. Blood sugar level
 - 3. Causes
- D. Hyperglycemia/DKA
 - 1. Physical findings
 - 2. Blood sugar level
 - 3. Causes
- E. Treatment
 - 1. Oxygenation and ventilation requirements
 - 2. Blood glucose determination

3. Oral glucose
 4. Glucagon administration
 5. IV placement and fluid therapy for
 - a. hyperglycemia
 - b. hypoglycemia
 6. D50 Administration
- F. Reassessment and Evaluation for Other Underlying Acute Illness in the Hyperglycemic Patient

Medicine Psychiatric

AEMT Education Standard

Applies fundamental knowledge to provide basic and selected advanced emergency care and transportation based on assessment findings for an acutely ill patient.

Transition Highlights

This section includes new material on agitated delirium.

AEMT-Level Instructional Guideline

The AEMT Instructional Guidelines in this section include all the topics and material at the EMT level PLUS the following material:

B. Agitated Delirium

1. Emergency medical care

a. Scene size-up, personal safety

b. Establish rapport

i. utilize therapeutic interviewing techniques

a) engage in active listening

b) supportive and empathetic

c) limit interruptions

d) respect patient's territory, limit physical touch

ii. avoid threatening actions, statements and questions

iii. approach slowly and purposefully

c. Patient assessment

i. intellectual functioning

ii. orientation

iii. memory

iv. concentration

v. judgment

vi. thought content

a) disordered thoughts

b) delusions, hallucinations

c) unusual worries, fears

vii. language

a) speech pattern and content

b) garbled or unintelligible

viii. mood

a) anxiety, depression, elation, agitation

b) level of alertness, distractibility

i) appearance, hygiene, dress

- ii) psychomotor activity
- d. Calm the patient – do not leave the patient alone, unless unsafe situation; consider need for law enforcement
- e. Restrain if necessary
- f. Transport
- g. If overdose, bring medications or drugs found to medical facility.

Medicine

Cardiovascular

AEMT Education Standard

Applies fundamental knowledge to provide basic and selected advanced emergency care and transportation based on assessment findings for an acutely ill patient.

Transition Highlights

This section includes increased emphasis on anatomy, physiology and pathophysiology; increased emphasis on specific cardiovascular emergencies.

AEMT-Level Instructional Guideline

The AEMT Instructional Guidelines in this section include all the topics and material at the EMT level PLUS the following material:

I. Anatomy of the Cardiovascular System

A. Location

1. Layers
 - a. Myocardium
 - b. Endocardium
 - c. Pericardium
 - i. visceral (epicardium)
 - ii. parietal
 - iii. pericardial fluid
2. Chambers
 - a. Atria
 - b. Ventricles
3. Valves
 - a. Atrioventricular (AV) valves
 - i. tricuspid (right)
 - ii. mitral (left)
 - b. Semilunar valves
 - i. pulmonic (right)
 - ii. aortic (left)
4. Myocardial blood supply
 - a. Arteries
 - b. Veins
5. Electrical and conduction system
 - a. Myocardial muscle cells
 - b. Specialized electrical cells
 - c. Automaticity
 - d. Autonomic Control

- i. sympathetic
- ii. parasympathetic

B. Vessels

- 1. Aorta
- 2. Arteries
- 3. Arterioles
- 4. Capillaries
- 5. Venules
- 6. Veins
- 7. Vena cava

C. Blood

- 1. Red blood cells
- 2. White blood cells
- 3. Platelets
- 4. Plasma

II. Physiology

A. Cardiac Cycle

- 1. Systole
- 2. Diastole

B. Pulses

- 1. Peripheral pulses
- 2. Central pulses

C. Blood Pressure

- 1. Systolic
- 2. Diastolic

D. Blood Circulation Through a Double Pump

- 1. Respiratory system
 - a. Deoxygenated blood to lungs
 - b. Oxygenated blood back to heart
- 2. Body

E. Cardiac Output

F. Perfusion

- 1. Function of red blood cells in oxygen delivery
- 2. Factors governing adequate perfusion
 - a. Rate
 - b. Pump
 - c. Volume

G. Oxygenation of Tissues

- 1. Delivery of oxygenated blood
- 2. Removal of tissue wastes

III. Angina Pectoris/Acute Coronary Syndrome

A. Epidemiology

B. Precipitating Causes

- 1. Atherosclerosis
- 2. Vasospastic (Prinzmetal's)

C. Morbidity/ Mortality

1. Not a self-limiting disease
2. Chest pain may dissipate, but myocardial ischemia and injury can continue
3. A single anginal episode may be a precursor to myocardial infarction
4. May not be cardiac in origin
5. Must be diagnosed by a physician
6. Related terminology
 - a. Defined as a brief discomfort, has predictable characteristics and is relieved promptly - no change in this pattern
 - b. Stable
 - i. occurs at a relative fixed frequency
 - ii. usually relieved by rest and/ or medication
 - c. Unstable
 - i. occurs without fixed frequency
 - ii. may or may not be relieved by rest and/ or medication
 - d. Initial - first episode
 - e. Progressive - accelerating in frequency and duration
 - f. Preinfarction angina
 - i. pain at rest
 - ii. sitting or lying down

D. Primary Survey Findings

1. Airway/ breathing
 - a. Labored breathing may or may not be present
2. Circulation
 - a. Peripheral pulses
 - i. quality
 - ii. rhythm
 - b. Peripheral perfusion
 - i. changes in skin color
 - ii. changes in skin temperature
 - iii. changes in skin moisture

E. History of the Present Illness/Sample History

1. Chief complaint
 - a. Typical - sudden onset of discomfort, usually of brief duration, lasting three to five minutes, maybe five to 15 minutes; never 30 minutes to 2 hours
 - b. Typical - usually relieved by rest and/ or medication
 - c. Epigastric pain or discomfort
 - d. Atypical
2. Denial
3. Contributing history
 - a. Initial recognized event
 - b. Recurrent event
 - c. Increasing frequency and/or duration of event

F. Secondary Survey Findings

1. Airway
2. Breathing
 - a. May or may not be labored
 - b. Breath sounds

- i. may be clear to auscultation
- ii. may be congested in the bases

3. Circulation

- a. Alterations in heart rate and rhythm may occur
- b. Peripheral pulses are usually not affected
- c. Blood pressure may be elevated during the episode and normalize afterwards

G. Management

- 1. Refer to American Heart Association guidelines
- 2. Rapid transport
 - a. Sense of urgency for reperfusion
 - b. No relief with medications
 - c. Hypotension/ hypoperfusion with CNS involvement

IV. Acute Myocardial Infarction

A. Epidemiology

B. Precipitating Causes (as With Angina)

- 1. Atherosclerosis
- 2. Persistent angina
- 3. Occlusion
- 4. Non-traumatic
- 5. Trauma

C. Morbidity/Mortality

- 1. Sudden death
- 2. Extensive myocardial damage
- 3. May result in ventricular fibrillation

D. Primary Survey Findings

- 1. Airway/breathing
- 2. Circulation
 - a. Peripheral pulses
 - i. quality
 - ii. rhythm
 - b. Peripheral perfusion
 - i. changes in skin color
 - ii. changes in skin temperature
 - iii. changes in skin moisture

E. History of the Present Illness/Sample History

- 1. Chief complaint
 - a. Typical onset of discomfort, usually of long duration, over 30 minutes
 - b. Typically unrelieved by rest and/ or nitroglycerin preparation
 - c. Epigastric pain or discomfort
 - d. Atypical
- 2. Contributing history
 - a. First time
 - b. Recurrent
 - c. Increasing frequency and/ or duration
- 3. Denial

F. Secondary Survey Findings

1. Airway
2. Breath sounds
 - a. May be clear to auscultation
 - b. Congestion in bases may be present
3. Circulation
 - a. Skin
 - i. pallor during the episode
 - ii. temperature may vary
 - iii. diaphoresis is usually present
 - b. Alterations in heart rate and rhythm may occur
 - c. Peripheral pulses are usually not affected
 - d. Blood pressure may be elevated or lowered

G. Management

1. Refer to American Heart Association guidelines
 - a. Scope of practice includes
 - i. oxygen
 - ii. aspirin
 - iii. nitroglycerin
 - iv. nitrous oxide
2. Transport
 - a. Criteria for rapid transport
 - i. no relief with medications
 - ii. hypotension/ hypoperfusion

Medicine

Toxicology

AEMT Education Standard

Applies fundamental knowledge to provide basic and selected advanced emergency care and transportation based on assessment findings for an acutely ill patient.

Transition Highlights

This section includes all new information.

AEMT-Level Instructional Guideline

The AEMT Instructional Guidelines in this section include all the topics and material at the EMT level PLUS the following material:

I. Toxic Syndromes

A. Introduction

1. Definition of a toxic syndrome (toxidrome)
2. Incidence of opiate abuse

B. Opiate Intoxication/Poisoning

1. Common causative agents
 - a. heroin, morphine, methadone
 - b. codeine, meperidine, propoxyphene
 - c. fentanyl, lortab, oxycontin
 - d. other
2. Assessment findings specific to opiate intoxication/poisoning
 - a. CNS -- Level of consciousness/behavior
 - i. euphoria
 - ii. decreased level of consciousness
 - iii. sedation
 - iv. pin-point pupils
 - v. seizures
 - vi. coma
 - b. Respiratory
 - i. decreased respiratory rate and effort
 - ii. apnea
 - c. Gastrointestinal
 - i. nausea
 - ii. vomiting
3. Management specific to opiate intoxication/poisoning
 - a. Airway/Breathing support
 - i. oxygenation requirements
 - ii. ventilatory requirements
 - a) considerations in use of oral pharyngeal airways
 - b) bag-valve mask

- c) considerations of use of the advanced airway in the opiate overdose patient
- b. Circulatory Support
 - i. causes of hypotension in the opiate overdose
 - ii. IV access
- c. Pharmaceutical interventions
- d. Other considerations in the care of the opiate overdose
 - i. underlying chronic illness
 - a) HIV/AIDS
 - b) hepatitis
 - c) malnutrition
 - d) sepsis
 - ii. family interaction and social issues
 - iii. chronic pain patients
 - a) drug dependency
 - b) consequences of narcotic antagonist use in the chronic pain patient

Medicine

Respiratory

AEMT Education Standard

Applies fundamental knowledge to provide basic and selected advanced emergency care and transportation based on assessment findings for an acutely ill patient.

Transition Highlights

This section includes more in-depth evaluation of a patient with respiratory problems.

AEMT-Level Instructional Guideline

The AEMT Instructional Guidelines in this section include all the topics and material at the EMT level PLUS the following material:

I. Anatomy and Physiology

A. Anatomy of the Pulmonary System

1. Upper airway
 - a. Function
 - b. Structures and functions of:
 - i. nose and nasopharynx
 - ii. pharynx
 - iii. hypopharynx
 - iv. larynx
2. Lower airway
 - a. Function
 - b. Structures and functions of:
 - i. trachea
 - ii. bronchi
 - iii. bronchioles
 - iv. cilia
3. Gas exchange
 - a. Function
 - b. Structures and functions of;
 - i. alveoli
 - ii. interstitial space
 - iii. pulmonary capillary bed
4. Chest wall
 - a. Function
 - b. Structures and function of:
 - i. diaphragm
 - ii. intercostal muscles
 - iii. accessory muscles
 - iv. pleural space

5. Neurological control of breathing
 - a. Function
 - b. Structures and functions:
 - i. medulla
 - ii. phrenic nerve
 - iii. spinal nerves
 - iv. Hering-Breuer reflex

II. Pathophysiology

A. Obstructive/Restrictive Lung Diseases

1. Emphysema

- a. changes in respiratory tract
- b. changes in gas exchange
- c. long term effects
- d. decompensated states

2. Chronic Bronchitis

- a. changes in respiratory tract
- b. changes in gas exchange
- c. long term effects
- d. decompensated states

3. Asthma

- a. changes in respiratory tract
- b. changes in gas exchange
- c. long term effects
- d. decompensated states

B. Infectious Lung Disease

1. Pneumonia

III. Assessment

A. Impact of Disease on Prehospital Assessment

1. Pertinent historical questions

2. Pertinent physical findings

a. Breath sounds

- i. coarse crackles
- ii. fine crackles
- iii. ronchi
- iv. wheezes
 - a) diffuse
 - b) continuous
- v. stridor
- vi. pleural rub

b. Inspiratory vs. Expiratory ratios

B. Finding Associated With Specific Diseases

1. Emphysema

2. Chronic Bronchitis

3. Asthma

4. Pneumonia

C. Age-Related Considerations

1. Pediatrics
 - a. variations in symptomatology
 - b. variations in physical presentation
 - i. asthma
 - ii. types of pneumonia
2. Geriatrics
 - a. variations in symptomatology
 - b. variations in physical presentation

IV. Treatment

- A. Oxygenation and Ventilation Requirements
- B. Use of Inhaled Beta-Agonists
- C. IV Fluid Therapy in Respiratory Illness
- D. Age-Related Considerations
 1. Pediatrics
 - a. dosage considerations
 - b. fluid considerations
 2. Geriatrics
 - a. drug interaction considerations
 - b. fluid considerations

Medicine

Hematology

AEMT Education Standard

Applies fundamental knowledge to provide basic and selected advanced emergency care and transportation based on assessment findings for an acutely ill patient.

Transition Highlights

This section includes a brief discussion of sickle cell disease.

AEMT-Level Instructional Guideline

The AEMT Instructional Guidelines in this section include all the topics and material at the EMT level PLUS the following material:

I. Sickle Cell Disease

A. Definition, Pathophysiology, Epidemiology, Mortality and Morbidity

1. Types of emergent presentations

a. Vaso-occlusive crisis

i. description

ii. signs and symptoms

iii. implications

b. Acute chest syndrome

i. description

ii. signs and symptoms

iii. implications

c. Acute splenic sequestration syndrome (pediatric)

i. description

ii. signs and symptoms

iii. implications

2. Patient management

a. Administer high-concentration oxygen

b. Initiate IV therapy

c. Maintain normothermic

d. Rest

e. Pain management

Medicine

Genitourinary/Renal

AEMT Education Standard

Applies fundamental knowledge to provide basic and selected advanced emergency care and transportation based on assessment findings for an acutely ill patient.

Transition Highlights

This section includes increased level of detail.

AEMT-Level Instructional Guideline

The AEMT Instructional Guidelines in this section include all the topics and material at the EMT level PLUS the following material:

I. Anatomy and Physiology

A. Urinary System

1. Structures
2. Functions

B. Pathophysiology

1. Renal Calculi (kidney stones)
 - a. Calculi formation
 - b. Consequences of renal calculi
2. Types of renal failure
 - a. Acute
 - b. Chronic
3. End-stage renal disease
 - a. Definition
 - b. Causes

C. Dialysis

1. Definition of dialysis
2. Process of dialysis
3. Types of dialysis
4. Complications/adverse effects of dialysis
 - a. Hypotension
 - b. Muscle cramps
 - c. Nausea/vomiting
 - d. Altered mentation, loss of consciousness
 - e. Hemorrhage from shunt
 - f. Air embolism
 - g. Myocardial ischemia
 - h. Infection
 - i. Electrolyte imbalance

- 5. Consequences of missed dialysis treatment
 - a. Electrolyte excesses
 - b. Weakness
 - c. Pulmonary edema
- D. Assessment
 - 1. Findings in renal calculi
 - 2. Findings in renal failure
 - a. Acute
 - b. Chronic
 - c. End-stage
- E. Management
 - 1. Renal calculi patient
 - a. Oxygen requirements
 - b. IV access
 - c. Fluid administration considerations
 - 2. Renal failure patients
 - a. Oxygen and ventilation requirements
 - b. IV access
 - i. hypotensive patient
 - ii. pulmonary edema patient
- F. Documentation
 - 1. Documentation of the renal calculi patient
 - 2. Documentation of dialysis complication patient

Medicine Gynecology

AEMT Education Standard

Applies fundamental knowledge to provide basic and selected advanced emergency care and transportation based on assessment findings for an acutely ill patient.

Transition Highlights

This section includes a brief discussion of sexually transmitted diseases and pelvic inflammatory disease.

AEMT-Level Instructional Guideline

The AEMT Instructional Guidelines in this section include all the topics and material at the EMT level.

Medicine

Non-traumatic Musculoskeletal Disorders

AEMT Education Standard

Applies fundamental knowledge to provide basic and selected advanced emergency care and transportation based on assessment findings for an acutely ill patient.

Transition Highlights

This section includes new information at this level.

AEMT-Level Instructional Guideline

The AEMT Instructional Guidelines in this section include all the topics and material at the EMT level.

Trauma

Trauma Overview

AEMT Education Standard

Applies fundamental knowledge to provide basic and selected advanced emergency care and transportation based on assessment findings for an acutely injured patient.

Transition Highlights

The Field Triage Decision Scheme was added to this section.

AEMT-Level Instructional Guideline

The AEMT Instructional Guidelines in this section include all the topics and material at the EMT level PLUS the following material:

I. Identification and Categorization of Trauma Patients

A. Entry-level students need to be familiar with the National Trauma Triage Protocol

1. Centers for Disease Control and Prevention. Guidelines for Field Triage of Injured Patients: Recommendations of the National Expert Panel on Field Triage. MMWR 2008;58 RR-1:1-35.

2. <http://cdc.gov/fieldtriage> contains the National Trauma Triage Protocols and additional instructional materials.

Trauma Bleeding

AEMT Education Standard

Applies fundamental knowledge to provide basic and selected advanced emergency care and transportation based on assessment findings for an acutely injured patient.

Transition Highlights

This section includes an increased level of detail.

AEMT-Level Instructional Guideline

The AEMT Instructional Guidelines in this section include all the topics and material at the EMT level PLUS the following material:

- I. Fluid Resuscitation in Bleeding and Shock
 - A. Pathophysiology of Shock
 1. Cardiac control in homeostasis of blood pressure
 - a. Changes in function in hemorrhagic shock
 - i. rate
 - ii. volume circulated
 - iii. preload
 - iv. afterload
 - v. Starling's law
 - vi. cardiac output
 - b. Loss of ability to compensate
 2. Neurological/Autonomic control in homeostasis
 - a. Vasoconstriction
 - i. peripheral
 - ii. central
 - iii. chemoreceptors
 - iv. baroreceptors
 - b. Loss of ability to compensate
 3. Blood vessels in homeostasis of blood
 - a. Neurovascular control
 - i. chemoreceptors
 - ii. baroreceptors
 - b. Clotting
 - c. Loss of ability to compensate
 - B. Blood Volume and Shock Stages
 1. Class I
 - a. Definition
 - b. Estimated blood loss
 - c. Assessment findings
 2. Class II

- a. Definition
 - b. Estimated blood loss
 - c. Assessment findings
- 3. Class III
 - a. Definition
 - b. Estimated blood loss
 - c. Assessment findings
- 4. Class IV
 - a. Definition
 - b. Estimated blood loss
 - c. Assessment findings
- C. Management of Bleeding and Shock Using Fluid Resuscitation
 - 1. Review of fluid physiology and special considerations in shock
 - a. Oncotic pressure
 - b. Hydrostatic pressure
 - c. Osmosis
 - d. Diffusion
 - 2. Review of IV skills and special considerations in shock
 - a. Vascular anatomy
 - b. Catheter selection
 - i. diameter impact
 - ii. length impact
 - c. Other considerations
 - i. tubing length and extension tubing
 - ii. impact of saline locks on IV flow
 - 3. General principles of shock management
 - a. Scene safety
 - b. Body substance isolation
 - c. Rapid transport without unnecessary scene delays
 - d. Airway
 - e. Breathing
 - i. hyperventilation is contraindicated
 - ii. monitor oxygen saturation to maintain above 90%
 - f. Circulation
 - i. control the external bleeding
 - a) start two large-bore IV's enroute
 - b) fluid replacement with warmed isotonic solution up to 30 ml/kg in 250 - 500 ml increments with frequent reassessments
 - c) monitor response to therapy
 - ii. internal bleeding and non-compressible bleeding
 - a) position the patient to maximize perfusion
 - b) consider PASG by protocol
 - c) start two large-bore IV's enroute
 - d) fluid replacement with warmed isotonic solution up to 20-30 ml/kg in boluses of 250-500 ml
 - e) maintain blood pressure between 70mm/hg and 90 mm/hg

4. Reassessment of fluid therapy after initial treatment
 - a. Rapid return to normal vitals and vitals remain normal
 - i. slow IV to TKO rate
 - ii. reassess often
 - b. Inconsistent response to initial treatment with initial improvement followed by slow deterioration
 - i. indicates ongoing uncontrolled blood loss
 - ii. maintain blood pressure between 70-90mm/Hg depending on local protocol

II. Special Considerations in Fluid Resuscitation

A. Permissive Hypotension

B. Reperfusion Injury

C. Pediatrics

1. Temperature control is critical in maintaining perfusion
2. Use of IV is for known required fluid replacement
3. Consider use of IO if peripheral vein is not accessible and patient is in immediate need of fluid
 - a. Keep normal vital signs by age on hand
 - b. Infuse up to 20cc/kg of warmed isotonic solution
 - c. Consider a second infusion of 20cc/kg if there is no response to first
 - d. Second infusion should be done keeping in mind that the patient needs rapid restoration of red blood cells while awaiting definitive care if shock is due to non-compressible hemorrhage
 - e. A third infusion of 20cc/kg may be considered in patients with controlled hemorrhage
 - f. The use of continuous infusion in uncontrolled hemorrhage should be done to maintain adequate perfusion levels of critical organs enroute to the hospital

D. Geriatrics

1. Patients with chronic hypertension may have higher blood pressure value needs to achieve the same level of end organ perfusion than other patients
 - a. Patient may be in shock with blood pressure above 100
 - b. Modest amounts of blood loss can lead to shock
 - i. reduced blood volume
 - ii. possible anemia
 - c. Patient is less able to tolerate excessive fluids
 - i. possible anemia
 - ii. possible electrolyte alterations

E. Obstetrical Patients

1. Shock states lead to shunting of blood away from fetus
2. The closer the maternal blood pressure is to normal, the better the fetal perfusion

Trauma

Chest Trauma

AEMT Education Standard

Applies fundamental knowledge to provide basic and selected advanced emergency care and transportation based on assessment findings for an acutely injured patient.

Transition Highlights

This section includes an increased level of detail.

AEMT-Level Instructional Guideline

The AEMT Instructional Guidelines in this section include all the topics and material at the EMT level PLUS the following material:

I. Traumatic Aortic Disruption

A. Pathophysiology

1. Role of deceleration and speed as MOI
2. Partial tear
3. Complete tear

B. Assessment

1. Mechanism of injury
2. High percent have no signs of external chest trauma
3. Hypotension
4. Signs of Shock
5. Chest pain – tearing in nature
6. Suspicion raises with chest wall injury
7. Unusual pulses or blood pressure in upper extremities
8. Voice changes
 - a. Hoarseness
 - b. Stridor
9. Difficulty swallowing

C. Management

1. Review knowledge from previous levels
2. AVO management
3. High index of suspicion based upon MOI
4. Do not over-hydrate

II. Pulmonary Contusion

A. Pathophysiology

1. Blunt trauma with associated injuries (rib fractures)
2. Capillary leakage into alveoli prevents gas exchange
3. Decrease lung compliance
4. Slowly developing process
5. Diffuse vs localized

B. Assessment

1. Respiratory distress symptoms
2. Hemoptysis
3. Chest pain from blunt trauma
4. Cough
5. rales or rhonchi
6. Hypoxia
7. High index of suspicion based on MOI

C. Management

1. AVO management
2. IV fluid administration – over hydration is contraindicated (see Trauma: Bleeding)

III. Blunt Cardiac Injury

A. Pathophysiology

1. Cardiac arrhythmias sometimes occur
2. Heart failure may occur
 - a. Review of right sided heart failure
 - b. Review of left-sided heart failure

B. Assessment

1. High index of suspicion with anterior blunt chest trauma
2. Clinical signs vary due to injury location in heart – vessels, muscle mass or conduction system
3. Tachycardia
4. May not exhibit external chest discoloration
5. Chest pain – retrosternal (MI type pain)

C. Management

1. High index of suspicion
2. AVO management
3. Limit fluids if signs of heart failure are present
 - a. Lung crackles
 - b. Jugular venous distension
4. Be prepared for deteriorations in patients with rapid or irregular pulses

IV. Hemothorax

A. Pathophysiology

1. Review knowledge from previous levels
2. Penetrating wounds
 - a. Tears in lung parenchyma
 - b. Puncture great vessels or heart
3. Clotting in the chest may release fibrolynsins – continue bleeding process
4. Loss of circulating blood in vessels

B. Assessment

1. Review knowledge from previous levels
2. Shock
3. Unequal breath sounds
4. Dullness on percussion
5. Jugular venous distention assessment

- a. Proper patient positioning for jugular venous assessment
- b. Flat with hypovolemia
- c. Distended if increased intrathoracic pressure

C. Management

- 1. Review knowledge from previous levels
- 2. AVO management
- 3. Fluid bolus and continued hypovolemia assessment (see Trauma: Bleeding)
- 4. Rapid transport to appropriate facility

V. Pneumothorax

A. Open

1. Pathophysiology

- a. Review knowledge from previous levels
- b. Open wound to the chest wall
- c. Fracture of chest wall structure
- d. Hypoxia
- e. Loss of lung adhesion to chest wall due to loss of surface tensioncollapse of lung

2. Assessment

- a. Review knowledge from previous levels
- b. AVO assessment
- c. Chest Assessment
 - i. inspection
 - ii. auscultation
 - iii. percussion
- d. Subcutaneous emphysema
- e. Hypovolemia signs
- f. Cardiac dysrhythmia

3. Management

- a. Review knowledge from previous levels
- b. Airway, respiration and ventilation management
- c. Inspect chest
 - i. cover open wounds with non-porous dressing
 - ii. excessive pressure ventilation can cause tension pneumothorax
- d. Pneumothorax complications
- e. Dysrhythmia treatment

B. Simple

1. Pathophysiology

- a. Review knowledge from previous levels
- b. Defect in chest wall allow air to enter pleural space
- c. Some low velocity wounds self-seal
- d. If chest wall hole is 2/3 size of trachea, more air will enter from the atmosphere – sucking sound will be present
- e. With large holes air enters both the trachea and the hole rapidly collapsing the lung
- f. Delayed or improper treatment will lead to tension Pneumothorax with large open wounds

2. Assessment

- a. Review knowledge from previous levels
 - b. AVO assessment
 - c. Chest Assessment
 - i. inspection
 - a) immediately cover open wounds with nonporous dressings
 - ii. auscultation
 - a) unequal breath sounds
 - iii. percussion
 - d. Subcutaneous emphysema
 - e. Hypovolemia signs
 - f. Cardiac dysrhythmia
3. Management
- a. Review knowledge from previous levels
 - b. Airway, respiration and ventilation management
 - c. Inspect chest
 - i. cover open wounds with non-porous dressing
 - ii. excessive pressure ventilation can cause tension pneumothorax
 - d. Pneumothorax complications
 - e. Dysrhythmia treatment

C. Tension

1. Pathophysiology
- a. Review knowledge of previous levels
 - b. Formation of one-way valve – air from either lungs or atmosphere
 - c. Increased pleural pressure – shift of mediastinal structures to contralateral side – causes kinking of great veins decreasing cardiac output
 - d. May be closed – untreated rupture of alveolar sac
 - e. May be open – penetrating trauma – injury to bronchus or bronchi
2. Assessment
- a. Review knowledge of previous levels
 - b. Severe respiratory distress
 - c. Jugular vein distention
 - d. Deviation of the trachea
 - i. almost never seen in the prehospital environment
 - ii. more easily seen on x-ray.
 - e. Tachycardia
 - f. Narrow pulse pressure
 - g. Absent breath sounds on affected side
 - h. Unequal chest rise
3. Management
- a. Review knowledge from previous levels
 - b. Airway, respiration and ventilation management
 - c. Inspect chest
 - i. cover open wounds with non-porous dressing
 - ii. excessive pressure ventilation can cause tension pneumothorax
 - d. Pneumothorax complications
 - e. Dysrhythmia treatment

VI. Cardiac Tamponade

A. Pathophysiology

1. Review knowledge from previous levels
2. Mechanism of injury
 - a. Penetrating trauma
 - b. Much more rare in blunt trauma
3. Blood in the pericardial sac
 - a. Perforation of heart muscle
 - b. Amount of blood dependent in where blood originates
 - c. Sac is not elastic – no stretching
 - d. Small amounts (55cc) can cause reduction in cardiac output
 - e. Increased sac pressure puts pressure on coronary arteries

B. Assessment

1. Jugular vein distention – increase in CVP
2. Increased diastolic pressure
3. Narrowed pulse pressure

C. Management

- a. Review knowledge from previous levels
- b. Airway, respiration and ventilation management
- c. Inspect chest
 - i. cover open wounds with non-porous dressing
 - ii. excessive pressure ventilation can cause tension pneumothorax
- d. Rapid IV fluid bolus
- e. Dysrhythmia treatment

VII. Rib Fractures

A. Pathophysiology

B. Assessment

C. Management

VIII. Flail Chest

A. Pathophysiology

B. Assessment

C. Management

IX. Commotio Cordis

A. Pathophysiology

B. Assessment

C. Management

Trauma

Abdominal and Genitourinary Trauma

AEMT Education Standard

Applies fundamental knowledge to provide basic and selected advanced emergency care and transportation based on assessment findings for an acutely injured patient.

Transition Highlights

This section includes an increased level of detail.

AEMT-Level Instructional Guideline

The AEMT Instructional Guidelines in this section include all the topics and material at the EMT level PLUS the following material:

I. Incidence

- A. Morbidity/Mortality

II. Anatomy

- A. Quadrants and Boundaries of the Abdomen
- B. Surface Anatomy of the Abdomen
- C. Intraperitoneal Structures
- D. Retroperitoneal Structures
- E. Reproductive Organs

III. Physiology

- A. Solid Organs
- B. Hollow Organs
- C. Vascular Structures

IV. Specific Injuries

- A. Closed Abdominal Trauma
 - 1. Mechanism of injury
 - a. Compression
 - b. Deceleration
 - c. MVA
 - d. Motorcycle collisions
 - e. Pedestrian injuries
 - f. Falls
 - g. Assault
 - h. Blast injuries
 - 2. Signs and Symptoms
 - a. Pain
 - b. Guarding
 - c. Distention – rise in abdomen between pubis and xiphoid process

- d. Discoloration of abdominal wall
 - e. Tenderness – on movement
 - f. Lower rib fractures
 - g. May be overlooked in multi-system injuries
 - h. Suspicion based on mechanism of injury
3. Assessment
 - a. Inspection
 - b. Noting position of the patient
 - c. Noting pain with movement
 - d. Auscultation – little value
 - e. Blood loss through rectum or vomit
 4. Management
 - a. Oxygen
 - b. Transport in position of comfort if indicated
 - c. Treat for shock – internal bleeding
- B. Penetrating/Open Abdominal Trauma
1. Low velocity penetration – knife wound, tear of abdominal wall, consider injury to underlying organ
 2. Medium velocity penetration – shot gun wound
 3. High-velocity penetration – gunshot wound
 4. Signs and Symptoms of penetrating abdominal trauma
 - a. Bleeding
 - b. Puncture wounds – entrance and exits
 - c. Many signs and symptoms of closed abdominal wounds could also be present along with a puncture wound
 5. Assessment
 - a. Clothing removal
 - b. Inspection – look for exit wounds including posterior
 - c. Noting position of patient
 6. Management
 - a. Cover wounds
 - b. Use non-porous dressing if chest may be involved
 - c. Treat for shock
 - d. Oxygen
 - e. Transport decision
- C. Considerations in Abdominal Trauma
1. Hollow organs injuries
 - a. Stomach
 - b. Small bowel
 - c. Large bowel
 - d. Gallbladders
 - e. Urinary bladder
 - f. Considerations of signs and symptoms of hollow organ injuries
 - i. pain – may be intense with open wounds to the stomach or small bowel
 - ii. infection – delayed complication which may be fatal
 - iii. air in peritoneal cavity
 2. Solid organ injuries

- a. Blood in the abdomen does not acutely produce abdominal pain
- b. Abdominal pain from solid organ penetration or rupture is of slow onset
- c. Liver
 - i. largest organ
 - ii. very vascular leading to hypo-perfusion
 - iii. injured with lower right rib fractures or penetrating trauma
- d. Spleen
 - i. injured in auto crashes, falls, bicycle accidents, motorcycles
 - ii. injured with lower left rib fractures or penetrating trauma
 - iii. left shoulder pain
- e. Pancreas
- f. Kidney
 - i. vascular
 - ii. blood in urine
- g. Diaphragm
 - i. abnormal respiratory sounds
 - ii. shortness of breath
- h. Retroperitoneal structures

V. General Assessment

- A. High Index of Suspicion
- B. Pain With Abdominal Trauma Is Often Masked Due to Other Injuries
- C. Airway Patency
- D. External and Internal Hemorrhage
- E. Identification and Management of Life Threats
- F. Spinal Immobilization
- G. Physical Exam
 - 1. Inspection
 - 2. Auscultation
 - 3. Palpation
- H. Associated Trauma
- I. Recognition and Prevention of Shock
- J. PASG for Pelvic Fracture Stabilization
- K. Transportation Decisions to Appropriate Facility

VI. General Management

- A. Scene Safety/Standard Precautions
- B. Airway Management
- C. Oxygenation and Ventilation
- D. Spinal Immobilization Considerations
- E. Control External Hemorrhage
- F. Identification of Life Threatening Injury
- G. Application and Inflation of PASG for Pelvic Fracture Stabilization
- H. Abdominal Trauma May Be Masked by Other Body System Trauma
- I. Transportation to Appropriate Facility
 - 1. No transport decisions
 - 2. Transport to acute care facility
 - 3. Transport to trauma center

4. ALS mutual aid

J. Communication and Documentation

VII. Age-Related Variations for Pediatric and Geriatric Assessment and Management

A. Pediatric

1. Mechanism of injury as pedestrian
2. Use of PASG (fracture stabilization)

B. Geriatric

VIII. Special Considerations of Abdominal Trauma

A. Sexual Assault

1. Criminal implications and evidence management
2. Patient confidentiality
3. Treat wounds as other soft tissue injuries

B. Vaginal Bleeding Due to Trauma

1. May be due to penetrating or blunt trauma
2. Assess to determine pregnancy
3. Apply sterile absorbent vaginal pad
4. Determine mechanism of injury
5. Do not insert gloved fingers for instruments in vagina

Trauma

Head, Facial, Neck, and Spine Trauma

AEMT Education Standard

Applies fundamental knowledge to provide basic and selected advanced emergency care and transportation based on assessment findings for an acutely injured patient.

Transition Highlights

This section includes an increased level of detail about neck, eye, oral and brain injuries; emphasizes the harm of over ventilation in most situations.

AEMT-Level Instructional Guideline

The AEMT Instructional Guidelines in this section include all the topics and material at the EMT level PLUS the following material:

I. Facial Fractures

A. Types

1. Soft tissue injuries
2. Fractures of facial bones
3. Eye injuries
4. Oral/dental injuries
 - a. Mandibular fractures
 - b. Maxillar fractures

B. Unstable Facial Fractures

1. Pathophysiology
 - a. Categories of unstable facial fractures
 - i. Le Fort I - Fracture separates hard palate and lower maxilla from remainder of skull
 - ii. Le Fort II - Fracture separates the nasal and lower maxilla from the facial skull and remainder of the cranial bones
 - iii. Le Fort III (craniofacial disjunction) - Fracture separates the entire midface from the cranium.
 - b. Blunt trauma to the facial area most frequent cause
2. Specific assessment considerations
 - a. Facial instability
 - b. Epistaxis
 - c. Edema
 - d. Pain
3. Specific management considerations
 - a. Simple airway maneuvers are difficult
 - b. Intubation is method of choice for airway protection
 - c. Ventilation without intubation is difficult
 - d. Manual in-line intubation
 - e. Bleeding into the oral cavity; suction

f. Cricothyroidotomy if indicated

g. Soft tissue bleeding

C. Signs/Symptoms

1. Soft tissue injuries are similar to others, but swelling may be more severe.
2. Facial bones may fracture causing airway and ventilation complications
3. Eye injuries suffer soft tissue type injuries, abrasions, lacerations, punctures, chemical burns, etc
4. Eye injuries may cause vision disturbances
5. Eyes injured with chemicals need flushing with copious amounts of water
6. Excessive pressure on the eye may “blow out” bones in the orbit
7. Nasal fractures may cause bleeding
8. Oral injuries may cause airway management complications

D. Assessment Considerations in Facial and Eye Injuries

1. Inspection

- a. Open wounds
- b. Swelling
- c. Deformity of bones
- d. Eye clarity without foreign objects
- e. Eye symmetry
- f. Bone alignment in anatomical position

2. Palpation

3. Eye examination

- a. Follows finger up, down, lateral
- b. Can read regular print
- c. No blood visible in iris area

E. Management Considerations in Facial and Eye Injuries

1. Airway must remain open throughout care
2. Nasopharyngeal airways are contraindicated
3. Suctioning may be frequent
4. Broken teeth need to be brought to hospital with patient
5. Eyes with chemical burns may need to be flushed with copious amounts of water
6. Simple nose bleeds can be controlled by pinching nostrils
7. Eye injuries require patching of both eyes
8. Impaled objects in the eye must be stabilized
9. Impaled objects in cheeks may be removed
10. Patients with these injuries may be more comfortable sitting up
11. Bandaging should not occlude the mouth

II. Laryngeotracheal Injuries

A. Pathophysiology

1. Trauma directly to structures
2. Edema
3. Hemorrhage

B. Specific Assessment Considerations

1. Swelling
2. Voice changes
3. Hemoptysis

4. Subcutaneous emphysema
 5. Structural irregularity
- C. Specific Management Considerations
1. AVO
 - a. Airway obstruction common
 - b. Careful two man ventilation with bag/valve/mask
 - i. may multiple people to maintain effective seal
 - ii. may need frequent suctioning
 - iii. may need immediate surgical intervention at hospital do not delay transport
 - c. Consider advanced airway in apnea
 2. Combative patients
 - i. increased intracranial pressure
 - ii. hypoxia

Trauma

Nervous System Trauma

AEMT Education Standard

Applies fundamental knowledge to provide basic and selected advanced emergency care and transportation based on assessment findings for an acutely injured patient.

Transition Highlights

This section includes more detailed information on brain anatomy; emphasizes the harm of hyperventilation; references the Brain Trauma Foundation; and increased emphasis on neurological assessment.

AEMT-Level Instructional Guideline

The AEMT Instructional Guidelines in this section include all the topics and material at the EMT level PLUS the following material:

I. Incidence of Traumatic Brain Injury

- A. Morbidity/Mortality
- B. Prevention Strategies

II. Traumatic Brain Injury

- A. Anatomy
 - 1. Review of major structures of the brain
 - 2. Review of circulation in the brain
- B. Physiology
 - 1. Review of function of brain
- C. Pathophysiology
 - 1. Normal oxygen demand of brain
 - a. Limited oxygen storing capacity
 - b. Consequences of oxygen loss
 - 2. Role of gas concentrations in vascular diameter
 - a. Carbon dioxide and vasodilation
 - b. Oxygen and vasoconstriction
 - 3. Brain injury categories
 - a. Primary brain injury
 - b. Secondary brain injury
 - c. Coup/contracoup pattern
 - 4. Increasing intracranial pressure
 - a. Definition
 - b. Effects
 - c. Role of mean arterial pressure in maintaining perfusion
 - 5. Coma
 - a. Definition

- b. Posturing (decerebrate, decorticate)
 - c. Normal intracranial pressure (2 – 12 mmHg)
 - 6. Brain herniation
 - a. Definition
 - b. Effects (i.e. Cushing’s triad)
 - 7. Types of brain injuries
 - a. Concussion
 - b. Diffuse axonal injury
 - c. Contusion
 - d. Subdural hematoma
 - e. Epidural hematoma
 - f. Subarachnoid hemorrhage
 - g. Intracerebral hemorrhage
 - h. Penetrating brain trauma
 - 8. Associated Injuries -- Skull fractures
 - a. Linear
 - b. Depressed
 - c. Open
 - d. Basilar
- D. Specific Assessment Considerations
 - 1. Level of Consciousness
 - a. Signs of increasing intracranial pressure
 - b. Cerebral function
 - c. Cerebellar function
 - d. Cranial nerve function
 - i. pupil changes
 - ii. doll’s eyes
 - e. Peripheral/Motor function
 - 2. AVO
 - a. Alterations to respiratory and ventilatory effort
 - b. Spinal Concerns
 - 3. Vital sign irregularities
 - a. Blood pressure changes in intracranial pressure
 - i. early
 - ii. late
 - 4. Posturing
 - a. Types
 - b. Significance
 - 5. CSF presence
 - a. Causes
 - b. Significance
 - 6. Coma assessment
 - a. Glasgow Coma Scale
 - b. Neurological exam
 - i. pupils
 - ii. reflexes
- E. Special Management Considerations
 - 1. AVO with spinal precautions/immobilization

2. Ventilate/assist to maintain PaO₂ of 90mmHg
 - a. Cheyne-Stokes respirations
 - b. Irregular or slow respirations
3. Seizure precautions
4. Fluid management
 - a. Isolated head trauma
 - b. Multisystem trauma with hypovolemia
 - c. role of fluids in managing ICP
5. Role of hypothermia in coma

Trauma

Special Considerations in Trauma

AEMT Education Standard

Applies fundamental knowledge to provide basic and selected advanced emergency care and transportation based on assessment findings for an acutely injured patient.

Transition Highlights

This section includes new and increased emphasis content.

AEMT-Level Instructional Guideline

The AEMT Instructional Guidelines in this section include all the topics and material at the EMT level PLUS the following material:

I. Trauma in Pregnancy

A. Incidence

1. Mortality/morbidity
2. Risk factors
3. Prevention

B. Anatomy

1. Review of anatomical changes in pregnancy
 - a. Organ displacement
 - b. Organs of pregnancy
 - c. Stages of fetal development/size

C. Physiology

1. Review of physiological changes in pregnancy
 - a. Respiratory
 - b. cardiovascular

D. Pathophysiology

1. Shock in pregnancy
 - a. Effects on mother
 - i. shunting
 - ii. increased volume requirements
 - iii. changes in usual findings
 - b. Effects on fetus
2. Traumatic abruptio placenta
 - a. Mechanisms of injury
 - b. Effects on mother
 - c. Effects on fetus
3. Abdominal injuries
 - a. Mechanisms of injury
 - b. Effects on mother
 - c. Effects on fetus
4. Pelvic fracture

- a. Mechanisms of injury
 - b. Effects on mother
 - c. Effects on fetus
- 5. Seat belt injuries
 - a. Mechanisms of injury
 - b. Effects on mother
 - c. Effects on fetus
- 6. Sexual assault
 - a. Mechanisms of injury
 - b. Effects on mother
 - c. Effects on fetus
- E. Special Considerations in Assessment
 - 1. Increased heart rate is not an early sign of hypovolemic shock
 - 2. Significant blood loss may not be reflective of usual signs of shock
 - 3. Respiratory rate less than 20 should not be considered adequate ventilation
 - 4. Loss of landmarks for chest compressions in arrest
 - 5. Signs of abruption placentae
 - 6. Estimating gestational age of fetus
 - a. Palpation of uterine fundus
 - b. Auscultation of fetal heart tones
 - i. stethoscope position
 - ii. uterine pulse
- F. Special Considerations in Management
 - 1. AVO
 - a. Restriction of diaphragm in mother
 - i. fetal size
 - ii. maternal position
 - 2. Circulation
 - a. Fetal pressure on great vessels
 - i. impact on spinal precautions
 - ii. impact on fluid replacement requirements
 - b. IV and fluid management
 - i. the closer the maternal blood pressure is to normal, the better the fetal perfusion
 - ii. normal blood pressure varies by trimester
 - 3. Traumatic arrest
 - a. Treatment decisions
 - b. Transport decisions
 - c. Alterations to CPR
 - i. increased airway pressures
 - ii. decreased diaphragm excursion
 - iii. effects on airway management
 - a) BVM management
 - b) advanced airway management

II. Pediatric Trauma

A. Incidence

1. Mortality/morbidity

- a. Accidental
 - b. Intentional
 - 2. Risk factors
 - 3. Prevention
- B. Anatomy
 - 1. Review of anatomical differences by age
 - a. Newborn
 - b. Infant
 - c. Child
 - i. preschool
 - ii. school-age
 - iii. adolescent
 - 2. Review of impact of differences on care
- C. Physiology
 - 1. Review of anatomical differences by age
 - a. Cardiac differences
 - b. Catecholamine regulation
 - c. Review of impact of differences on care
- D. Pathophysiology
 - 1. Alterations to response of shock in the child
 - 2. Alterations to response of head injury in the newborn/child
 - 3. Alterations to response of spine to injury in the child (i.e. Spinal Cord Injury Without Radiographic Abnormality)
 - 4. Alterations to response to chest injury in the child
 - a. Very compliant
 - b. Injury requires great force
 - c. Sudden impact of blunt force to the chest resulting in cardiac dysfunction, even death
 - d. Alterations to response to abdominal injuries in the child
 - e. Relatively larger solid organs
 - f. Less protection from ribs
 - g. Weaker abdominal muscles
 - 5. Musculoskeletal
 - a. Damage to epiphyseal plate
 - b. Damage to bone matrix
- E. Special Considerations in Assessment
 - 1. Airway, Breathing, and Circulation
 - a. Review of pediatric anatomy
 - b. Review of normal ventilatory effort in the child
 - c. Review of signs of respiratory distress in child
 - 2. Circulation
 - a. Hypotension appears late, use other signs of inadequate circulation
 - b. Capillary refill may be helpful
 - c. Inadequate oxygenation cause bradycardia
 - d. Level of Consciousness may indicate inadequate circulation
 - i. BP estimated as $80 + 2$ times the age
 - ii. 80ml/Kg blood loss can cause shock
 - 3. Neurological

- a. Glasgow Coma Score less than 8 means increased ICP
 - b. Beware of shaken baby syndrome
- 4. Head
 - a. Very vascular, even scalp laceration can cause shock
 - b. Falls less than 5 feet are significant
- 5. Chest
 - a. Significant internal injury can be present without any external signs
 - b. Tension-pneumothorax is difficult to evaluate
- 6. Abdomen
 - a. Spleen most common injured
 - b. Cullen's sign
 - c. Kehr's sign
- F. Special Considerations in Management
 - 1. Airway, Breathing, and Circulation (improper management is the most common cause of preventable pediatric death)
 - a. High-concentration oxygen and saturation
 - b. Proper advanced airway tube selection
 - 2. Circulation
 - a. IV selection in the pediatric trauma selection
 - i. site selection
 - ii. access type
 - a) peripheral
 - iii. keep normal vital signs by age on hand
 - iv. infuse up to 20cc/kg of warmed isotonic solution
 - v. consider a second infusion of 20cc/kg if there is no response to first
 - vi. second infusion should be done keeping in mind that the patient needs rapid restoration of red blood cells while awaiting definitive care if shock is due to non-compressible hemorrhage
 - vii. third infusion of 20cc/kg may be considered in patients with controlled hemorrhage
 - viii. use of continuous infusion in uncontrolled hemorrhage should be done to maintain adequate perfusion levels of critical organs enroute to the hospital
 - ix. maintain body heat to prevent more rapid deterioration
 - b. Fluid replacement

III. Geriatric Trauma

A. Incidence

- 1. Mortality/morbidity
 - a. Accidental
 - b. Intentional
- 2. Risk factors
- 3. Prevention

B. Review of Anatomical Changes of Aging

C. Review of Physiological Changes of Aging Affecting Trauma

- 1. Respiratory
 - a. Chest wall less compliant

- b. Less vital capacity
 - c. Decrease in ciliary action
 - 2. Cardiovascular
 - a. Heart rate and stroke volume decrease
 - b. Dysrhythmia changes
 - 3. Neurological system
 - a. Neuron mass reduction
 - b. Velocity of impulses
 - c. Mentation changes
 - d. Thermoregulation changes
- D. Special Considerations in Assessment
 - 1. History
 - a. Can be unreliable historian
 - b. Underlying disease can change normal baseline for patient
 - i. mentation
 - ii. vital signs
- E. Special Considerations in Management
 - 1. Airway, Breathing, And Circulation Review
 - a. Mask seal with toothless patient
 - b. Cervical kyphosis
 - c. Oxygen saturation can quickly deteriorate
 - 2. Circulation
 - a. Patients with chronic hypertension may have higher blood pressure value needs to achieve the same level of end organ perfusion than other patients
 - b. Patient may be in shock with blood pressure above 100 mmHg
 - c. Modest amounts of blood loss can lead to shock
 - i. reduced blood volume
 - ii. possible anemia
 - d. Patient is less able to tolerate excessive fluids
 - i. possible anemia
 - ii. possible electrolyte alterations

IV. Cognitively Impaired Patient Trauma

- A. Incidence
 - 1. Mortality/morbidity
 - a. Accidental
 - b. Intentional
 - 2. Risk factors
 - 3. Prevention
- B. Types of Cognitive Impairment
- C. Challenges With Cognitive Impaired Patients
 - 1. Ability of individual to communicate complaints
 - 2. Unreliable historian
 - 3. Unusual presentation of common disorders
 - 4. Reduced pain threshold
 - 5. Consent to treat complications
- D. Special Considerations in Assessment

1. Level of development
 - a. 5th or 6th grade level is common
 - b. Use open-ended questions to assess development
 - c. Particular difficulty with time and causality concepts
2. Communication ability assessment
 - a. How does patient normally communicate?
 - b. How aware are they of environment?
 - c. What are usual motor skills and level of activity?
 - d. Use a high-function concept and have them repeat it back
3. Assess/determine hearing and sight problems
4. Take vital signs when patient is calm
5. Typically helpful to have a caregiver present during physical exam.

Trauma

Environmental Emergencies

AEMT Education Standard

Applies fundamental knowledge to provide basic and selected advanced emergency care and transportation based on assessment findings for an acutely injured patient.

Transition Highlights

Same breadth and depth as the EMT level.

AEMT-Level Instructional Guideline

The AEMT Instructional Guidelines in this section include all the topics and material at the EMT level.

Trauma

Multi-System Trauma

AEMT Education Standard

Applies fundamental knowledge to provide basic and selected advanced emergency care and transportation based on assessment findings for an acutely injured patient.

Transition Highlights

This section includes new material and a discussion of kinematics and blast injury.

AEMT-Level Instructional Guideline

The AEMT Instructional Guidelines in this section include all the topics and material at the EMT level PLUS the following material:

I. Kinematics of Trauma

A. Definition

1. Looking a trauma scene and attempting to determine what injuries might have resulted
2. Kinetic energy – function of weight of an item and its speed.
3. Blunt trauma
 - a. Objects collide during crashes
 - i. car with object
 - ii. victim with part of car
 - iii. organs collide inside body
 - b. Unbelted drivers and front seat passengers suffer multi-system trauma due to multiple collisions of the body and organs
 - c. Direction of the force has impact on type of injury
 - i. frontal impacts
 - ii. rear impacts
 - iii. side impacts
 - iv. rotational impacts
 - v. roll-overs
4. Deceleration injuries
5. Penetrating trauma
 - a. Types of bullets have affect
 - i. distance from shooter
 - ii. size of bullet
 - iii. fragmentation
 - iv. cavitation
 - b. Energy levels have effect
 - i. low energy -- stabbings
 - ii. medium energy -- handguns, some rifles
 - iii. high energy -- military weapons
 - c. Organs stuck have effect

- i. head
- ii. chest
- iii. abdomen
- iv. extremities

II. Multi-System Trauma

A. Definition

1. Almost all trauma effects more than one system
2. Typically a patient considered to have “multi-trauma” has more than one major system or organ involved
 - a. Head and spinal trauma
 - b. Chest and abdominal trauma
 - c. Chest and multiple extremity trauma
3. Multi-trauma treatment will involve a team of physicians to treat the patient such as neurosurgeons, thoracic surgeons, and orthopedic surgeons
4. Multi-trauma has a high level of morbidity and mortality

B. The Golden Principles of Out-of-Hospital Trauma Care

1. Safety of patient and rescue personnel
2. Determination of additional resources
3. Kinematics
 - a. Mechanism of injury
 - b. High index of suspicion
4. Identify and manage life threats
5. Airway management while maintaining cervical spinal immobilization
6. Support ventilation and oxygenation
7. Control external hemorrhage
8. Basic shock therapy
 - a. Maintain normal body temperature
 - b. Splint musculoskeletal injuries
9. Maintain spinal immobilization on long board
 - a. Standing patients
 - b. Sitting patients
 - c. Rapid transport considerations
 - d. Prone patients
 - e. Supine patients
10. Transportation considerations
 - a. Golden period
 - b. Closest appropriate facility
 - c. ‘Platinum 10 Minutes’
11. Obtain medical history
12. Secondary survey after maintenance of life threats
13. “Do No Further Harm”

C. Critical Thinking in Multi-System Trauma Care

1. Airway, ventilation and oxygenation are key elements to success
 - a. Airways must be opened and clear throughout care
 - b. Adequate ventilation must occur
 - c. Oxygenation in multi-system trauma is high concentrations of oxygen
2. Oxygenation cannot occur when patients are bleeding profusely

- a. Stop arterial bleeding rapidly
- b. Consider use of tourniquets in emergent, hostile or multiple patient situations where bleeding is considerable
- 3. Sequence of treating patients
 - a. Not all treatments are linear. At times care must be adjusted depending on the needs of the patient.
 - b. Example:
 - i. control arterial bleeding in an awake patient first
 - ii. much care can be done en route
- 4. Rapid transport is essential
 - a. The definitive care for multi-system trauma is surgery which can not be done in the field
 - b. On scene time is critical and should not be delayed
 - c. Rapid extraction is an important consideration
 - d. Use of ALS intercept and air medical resources in a multi-trauma patient should be highly considered
 - e. Early notification of hospital resources is essential once rapidly leaving the scene
 - f. Transport to the appropriate facility is critical
- 5. Backboards
- 6. Documentation and reporting
 - a. AEMTs are the only ones at the scene of multi-trauma patients
 - i. AEMTs are the eyes and ears of the physicians
 - ii. AEMTs need to re-create the scene
 - iii. important kinematics and mechanisms of injury are important to trauma teams
 - iv. changes in vital signs or assessment findings while en route are critical to report and document
- 7. Personal safety
 - a. Most important when arriving on scene, and throughout care, an injured AEMT can not provide care
 - b. Be sure to assess your environment
 - i. passing automobiles
 - ii. hazardous situation
 - iii. hostile environments
 - iv. unsecured crime scenes
 - v. suicide patients who may become homicidal
- 8. Experience
 - a. Newly licensed AEMTs who have not seen many multi-system trauma patients need to stick with the basics of life saving techniques
 - b. Do not develop “tunnel” vision by focusing on patients who complain of lots of pain and are screaming for your help while other quiet patients who may be hypoxic or bleeding internally can not call out for help because of decreases in level of consciousness
 - c. Be suspicious at trauma scenes, sometimes an obvious injury is not the critical cause one the potential for harm.
 - d. Trauma care is a leading cause of death of young people. It is essential you keep important care principles in mind when providing care

III. Specific Injuries Related to Multi System Trauma

A. Blast Injuries

1. Types of blast injuries (explosions)
 - a. Release
 - i. blast waves
 - ii. blast winds
 - iii. ground shock
 - iv. heat
2. Pathophysiology
 - a. Blast waves when the victim is close to the blast cause disruption of major blood vessels, rupture of major organs, and lethal cardiac disturbances
 - b. Blast winds and ground shock can collapse buildings, cause trauma
3. Signs/symptoms
 - a. Hollow organs are injured first
 - b. Multi-system injury sign and symptom patterns
 - i. lungs
 - ii. heart
 - iii. major blood vessels
4. Management considerations in blast injuries
 - a. Multi-system trauma care
 - b. Immediate transport to appropriate facility
 - c. Multi-casualty care

Special Patient Populations

Obstetrics

AEMT Education Standard

Applies a fundamental knowledge of growth, development, aging, and assessment findings to provide basic and selected advanced emergency care and transportation for a patient with special needs.

Transition Highlights

This section includes a more detailed discussion on complications of pregnancy and uses the terms preeclampsia, eclampsia and premature rupture of membranes (which do not require a lengthy discussion.)

AEMT-Level Instructional Guideline

The AEMT Instructional Guidelines in this section include all the topics and material at the EMT level.

Special Patient Populations Pediatrics

AEMT Education Standard

Applies a fundamental knowledge of growth, development, aging, and assessment findings to provide basic and selected advanced emergency care and transportation for a patient with special needs.

Transition Highlights

This section includes increased level of detail throughout.

AEMT-Level Instructional Guideline

The AEMT Instructional Guidelines in this section include all the topics and material at the EMT level.

Special Patient Populations

Geriatrics

AEMT Education Standard

Applies a fundamental knowledge of growth, development, aging, and assessment findings to provide basic and selected advanced emergency care and transportation for a patient with special needs.

Transition Highlights

This section includes all new content.

AEMT-Level Instructional Guideline

The AEMT Instructional Guidelines in this section include all the topics and material at the EMT level PLUS the following material:

- I. Fluid Resuscitation in the Elderly
 - A. Patients With Chronic Hypertension May Have Higher Blood Pressure Value Needs to Achieve the Same Level of End Organ Perfusion Than Other Patients
 - 1. Patient may be in shock with blood pressure above 100
 - 2. Modest amounts of blood loss can lead to shock
 - a. Reduced blood volume
 - b. Possible anemia
 - 3. Patient less able to tolerate excessive fluids
 - a. Possible anemia
 - b. Possible electrolyte alterations
 - 4. Hemodilution

Special Patient Populations Patients With Special Challenges

AEMT Education Standard

Applies a fundamental knowledge of growth, development, aging, and assessment findings to provide basic and selected advanced emergency care and transportation for a patient with special needs.

Transition Highlights

This section includes new content on elder abuse, homelessness, poverty, bariatric, more technology dependent, hospices, sensory deficit, homecare, and developmental disabilities.

AEMT-Level Instructional Guideline

The AEMT Instructional Guidelines in this section include all the topics and material at the EMT level PLUS the following material:

I. Abuse and Neglect

A. Child Abuse

1. Types of abuse
2. Epidemiology
3. Assessment
 - a. History or scene findings to concern for abuse or neglect
 - b. Caregiver's behavior
 - c. Physical findings
4. Management
 - a. Reporting
 - b. Safely transporting
 - c. Role of child/adult protective services
5. Legal aspects
6. Documentation

B. Elder Abuse

1. Types of abuse
2. Epidemiology
3. Assessment
4. Management
5. Legal aspects
6. Documentation

II. Homelessness/Poverty

- A. Advocate for Patient Rights and Appropriate Care
- B. Identify Facilities That Will Treat Regardless of Payment
- C. Prevention Strategies Will Likely Be Absent, Increasing the Probability of Disease
- D. Familiarity With Assistance Resources Offered in Community

III. Bariatric Patients

- A. Increased Risk for
 - 1. Diabetes
 - 2. Hypertension
 - 3. Heart disease
 - 4. stroke
- B. Patient Handling Issues
 - 1. to prevent back injuries
 - 2. to position the patient to breathe

IV. Technology Assisted/Dependent

- A. Ventilation Devices
- B. Apnea Monitoring/Pulse Oximetry
- C. Long Term Vascular Access Devices
- D. Dialysis Shunts
- E. Nutritional Support
- F. Elimination Diversion

V. Hospice Care and Terminally Ill

- A. What Is Hospice?
 - 1. Comfort care versus curative care
 - 2. Terminally ill as verified by physician
 - 3. Typically cancer, heart failure, Alzheimer's disease, AIDS
- B. EMS Intervention
- C. DNR Orders

VI. Tracheostomy Care

- A. Tracheostomy: Surgical Opening From the Anterior Neck Into the Trachea
- B. Consists of
 - 1. Stoma
 - 2. Outer cannula
 - 3. Inner cannula
- C. Routine Care
 - 1. Keep stoma clean and dry
 - 2. Change outer cannula as needed
 - 3. Suction as needed
- D. Acute Care

VII. Sensory Deficits

- A. Sight
 - 1. Service dogs
 - 2. Allow patient to take your arm
 - 3. Other
- B. Hearing Impaired
 - 1. Hearing aid issues
 - 2. Communication
 - a. face patient (so he can lip read)
 - b. lighted area

- c. communicate by writing
- d. obtain sign language interpreter

C. Paralysis

- 1. Hemiplegia
- 2. Palsy
- 3. Paraplegia
- 4. Quadriplegia

VIII. Homecare

- A. Common for Patients Over Age 65
- B. Various Reasons for Calls

IX. Patient With Developmental Disability

- A. Treat Like Any Other Patient
- B. Family or Friends May Supply Additional Information
- C. Take Special Care to Provide Explanations

EMS Operations

Principles of Safely Operating a Ground Ambulance

AEMT Education Standard

Knowledge of operational roles and responsibilities to ensure patient, public, and personnel safety.

Transition Highlights

This section includes increased depth of discussion on the risks of emergency response and leaving the scene.

AEMT-Level Instructional Guideline

The intent of this section is to give an overview of emergency response to ensure EMS personnel, patient, and other's safety during EMS operations. This does not prepare the entry-level student to be an experienced and competent driver.

Information related to the clinical management of the patient during emergency response is found in the clinical sections of the National EMS Education Standards and Instructional Guidelines for each personnel level.

The AEMT Instructional Guidelines in this section include all the topics and material at the EMT level.

EMS Operations

Multiple Casualty Incidents

AEMT Education Standard

Knowledge of operational roles and responsibilities to ensure patient, public, and personnel safety.

Transition Highlights

This section references Center for Disease Control (CDC) Field Triage Division Scheme: The National Trauma Triage Protocol.

AEMT-Level Instructional Guideline

The intent of this section is to give an overview of operating during a multiple casualty incident when a multiple casualty incident plan is activated.

Information related to the clinical management of the patients during a multiple casualty incident is found in the clinical sections of the National EMS Education Standards and Instructional Guidelines for each personnel level.

The AEMT Instructional Guidelines in this section include all the topics and material at the EMR and EMT level.

EMS Operations

Mass Casualty Incidents Due to Terrorism and Disaster

AEMT Education Standard

Knowledge of operational roles and responsibilities to ensure patient, public, and personnel safety.

Transition Highlights

This section includes all new content.

AEMT-Level Instructional Guideline

The intent of this section is to give an overview of operating during a terrorist event or during a natural or manmade disaster.

Information related to the clinical management of patients exposed to a terrorist event is found in the clinical sections of the National EMS Education Standards and Instructional Guidelines for each personnel level.

I. Risks and Responsibilities of Operating on the Scene of a Natural or Man-Made Disaster

A. Role of EMS

1. Personal safety
2. Provide patient care
3. Initiate/operate in an incident command system (ICS)
4. Assist with operations

B. Safety

1. Personal
 - a. First priority for all EMS personnel
 - b. Appropriate personnel protective equipment for conditions
 - c. Scene size-up
 - d. Time, distance, and shielding for self-protection
 - e. Emergency responders are targets
 - f. Dangers of the secondary attack
2. Patient
 - a. Keep them informed of your actions
 - b. Protect from further harm
 - c. Signs and symptoms of biological, nuclear, incendiary, chemical and explosive (B-NICE) substances
 - d. Concept of “greater good” as it relates to any delay
 - e. Treating terrorists/criminals
3. 360-degree assessment and scene size-up
 - a. Outward signs and characteristics of terrorist incidents
 - b. Outward signs of a weapons of mass destruction (WMD) incident
 - c. Outward signs and protective actions of biological, nuclear, incendiary, chemical, and explosive (B-NICE) weapons

4. Determine number of patients (implement local multiple-casualty incident (MCI) protocols as necessary)
5. Evaluate need for additional resources
6. EMS operations during terrorist, weapons of mass destruction, disaster events
 - a. All hazards safety approach
 - b. Initially distance from scene and approach when safe
 - c. Ongoing scene assessment for potential secondary events
 - d. Communicate with law enforcement at the scene of an armed attack
 - e. Initiate or expand incident command system as needed
 - f. Perimeter use to protect rescuers and public from injury
 - g. Escape plan and a mobilization point at a terrorist incident
7. Care of emergency responders on scene
 - a. Safe use of an auto injector for self and peers
 - b. Safe disposal of auto injector devices after activation

EMS Operations Incident Management

AEMT Education Standard

Knowledge of operational roles and responsibilities to ensure patient, public, and personnel safety.

Transition Highlights

ICS and federal requirements added to this section.

AEMT-Level Instructional Guideline

Information related to the clinical management of the patient within components of the Incident Management System (IMS) is found in the clinical sections of the National EMS Education Standards and Instructional Guidelines for each personnel level.

I. Establish and Work Within the Incident Management System

A. Entry-Level Students Need to Be Certified in

1. ICS-100: Introduction to ICS (<http://training.fema.gov/emiweb/is/is100b.asp>), or equivalent

2. FEMA IS-700: NIMS, An Introduction (<http://training.fema.gov/EMIWeb/is/is700.asp>)

B. This Can Be Done as a Co requisite or Prerequisite or as Part of the Transition Course

EMS Operations

Hazardous Materials Awareness

AEMT Education Standard

Knowledge of operational roles and responsibilities to ensure patient, public, and personnel safety.

Transition Highlights

This section includes a new requirement.

AEMT-Level Instructional Guideline

Information related to the clinical management of the patient exposed to hazardous materials is found in the clinical sections of the National EMS Education Standards and Instructional Guidelines for each personnel level.

- I. Risks and Responsibilities of Operating at a Hazardous Material or Other Special Incident
 - A. Entry-Level Students Need to Be Certified in one of the following:
 - 1. Hazardous Waste Operations and Emergency Response (HAZWOPER) standard, 29 CFR 1910.120 (q)(6)(i) -First Responder Awareness Level*
 - 2. Other courses may qualify to meet this requirement. Contact the Idaho EMS Bureau for more details.
 - B. This Can Be Done as a Co requisite or Prerequisite or as Part of the Transition Course

*There are a number of sources for this training. Michigan State University is offering this training program at no cost to agencies in the public sector for a limited time. Visit http://www.saferesponse.com/sub_page/hazmat_main.htm for more details.

EMS Operations

Extrication Awareness

AEMT Education Standard

Knowledge of operational roles and responsibilities to ensure patient, public, and personnel safety.

Transition Highlights

This section includes a new requirement.

AEMT-Level Instructional Guideline

The intent of this section is to provide an overview of vehicle extrication to ensure EMS personnel and patient safety during extrication and so those who respond to motor vehicle accidents will be able to function safely as part of a “Rescue Team” as directed by the Incident Commander. This does not prepare the entry-level student to become a vehicle extrication expert or technician.

Information related to the clinical management of the patient being cared for during vehicle extrication is found in the clinical sections of the EMS Education Standards and Instructional Guidelines for each personnel level.

I. Establish and Work Within State Extrication Awareness Training

A. Entry-Level Students Need to Complete

1. Idaho Extrication Awareness training course (details available at www.idahoems.org)
2. Idaho Emergency Services Training (EST) - Extrication Operations Course

B. This Can Be Done as a Co requisite or Prerequisite or as Part of the Transition Course

II. Extrication Awareness Training Must Include the Following:

A. Introduction

B. What is Extrication

C. Scene Size-up

1. Scene Security
2. Incident Management System (IMS)
3. Collision Forces
4. Fire Protection
5. Resource Identification/Activation
6. Special Situations

D. Vehicle Systems

E. Vehicle Stabilization and Gaining Access

F. Patient(s) Care

Psychomotor Skills

AEMT Education Standard

Safely and effectively perform all psychomotor skills within the National EMS Scope of Practice Model AND state Scope of Practice at this level.

Transition Highlights

This section highlights psychomotor skills removed from the Scope of Practice and includes new content for skills added to the Scope.

AEMT-Level Instructional Guideline

The intent of this section is to provide an overview of skills or intervention changes between the Idaho License levels based on the old Idaho Standard Curriculum (ISC) and the new license levels based on the 2011 Idaho EMS Curriculum (IEC).

For more information on Idaho Scope of Practice changes, visit the Idaho EMS Physician Commission website at www.emspc.dhw.idaho.gov for the Draft 2012-1 EMSPC Future Scope of Practice grid which highlights changes between the old scope and new 2012 EMSPC Scope.

- I. Skills or interventions added
 - A. Airway / Ventilation / Oxygenation
 - 1. Automatic transport ventilators (ATV) for non-intubated patients
 - B. Assessment
 - 1. Pulse Oximetry
 - C. Vascular Access / Fluids
 - 1. Intraosseous - Adult
 - D. Technique of Medication Administration
 - 1. Aerosolized (MDI)
 - 2. Inhaled – patient administered (nitrous oxide)
 - 3. Intramuscular (IM)
 - 4. Intranasal
 - 5. Intraosseous – Adult
 - 6. IV Push – D50/concentrated dextrose solutions only
 - 7. Nebulized (SVN)
 - 8. Subcutaneous
 - 9. Sub-lingual
 - E. Pharmacological interventions
 - 1. Aspirin for chest pain
 - 2. Atropine sulfate & 2-Pralidoxime chloride auto-injector (e.g. Mark-1, Duo-Dote)
 - 3. Dextrose 50%
 - 4. Dextrose, concentrated solutions
 - 5. Epinephrine (Adrenalin)
 - 6. Epinephrine Auto Injector
 - 7. Glucagon

8. Inhaled Beta Agonist
 9. Naloxone
 10. Nitroglycerin – Sublingual
 11. Nitrous Oxide (Nitronox)
- II. Skills or interventions removed
- A. Intubation – Orotracheal (Optional Module)