

State of Wisconsin

Emergency Medical Technician: A Practice Based Approach to EMS Education

Review and Revision of the EMT Curriculum
with inclusion of the
National Emergency Medical Services
Education Standards

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System Board



Dept. of Health Services-
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and Emergency Response

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TABLE OF CONTENTS

Project Perspectives	V
Module 1 – Preparatory	
1-1 Introduction to Emergency Care	1-1
1-2 Workforce Safety and Wellness	1-8
1-3 Medical/Legal and Ethical Issues	1-15
1-4 Overview of the Human Body & Physiology	1-23
1-5 Pathophysiology	1-30
1-6 Lifting and Moving Patients	1-36
1-7 Evaluation	1-45
Module 2 - Patient Assessment	
2-1 Scene Size-up	2-1
2-2 Primary Assessment	2-5
2-3 History-Taking, Vital Signs, Monitoring Devices	2-11
2-4 Secondary Assessment	2-22
2-5 Reassessment	2-29
2-6 EMS System Communication & Therapeutic Communication	2-32
2-7 Documentation	2-41
2-8 Critical Thinking	2-47
2-9 Evaluation	2-53
Module 3 - Airway	
3-1 Airway Management, Respiration, & Artificial Ventilation	3-1
3-2 Practical Lab	3-18
3-3 Advanced Airways and Practical Lab	3-20
3-4 Evaluation	3-23
Module 4 – Overview of Shock	
4-1 Overview of Shock	4-1
4-2 Evaluation	4-9
Module 5 – Medical	
5-1 Medical Overview	5-1
5-2 Pharmacology and Medication Administration	5-4
5-3 Respiratory Emergencies	5-9
5-4 Cardiac Emergencies	5-21
5-5 Hematology	5-33
5-6 Abdominal/Gastrointestinal & Genitourinary/Renal Disorders	5-37
5-7 Endocrine Disorders & Neurology	5-42
5-8 Immunology	5-52
5-9 Toxicology	5-57
5-10 Psychiatric	5-67
5-11 Obstetrics & Gynecology	5-73

5-12	Practical Lab	5-12
5-13	Evaluation	5-85
Module 6 - Trauma		
6-1	Trauma Overview	6-1
6-2	Bleeding	6-8
6-3	Soft Tissue Injuries & Burns; External Injuries to the Head, Face & Neck; Injuries to the Chest, Abdomen & Genitalia	6-13
6-4	Orthopedic Trauma	6-36
6-5	Nervous System, Head & Spine	6-45
6-6	Environmental Emergencies	6-60
6-7	Special Considerations in Trauma	6-73
6-8	Practical Lab	6-81
6-9	Evaluation	6-84
Module 7-Special Patient Populations		
7-1	Pediatric	7-1
7-2	Geriatric	7-16
7-3	Patients with Special Challenges	7-26
7-4	Evaluation	7-32
Module 8-EMS Operations		
8-1	Ambulance Operations	8-1
8-2	Air Medical & Advanced Life Support Intercept	8-9
8-3	Gaining Access	8-13
8-4	Hazardous Materials	8-17
8-5	Mass Casualty Incident, Incident Command System, & National Incident Command System	8-20
8-6	Weapons of Mass Destruction	8-23
8-7	Evaluation	8-27

State of Wisconsin Emergency Medical Technician: A Practice Based Approach to EMS Education with inclusion of the National Emergency Medical Services Education Standards

Preface

EMS is continually evolving not only in the prehospital care that is given to patients but, naturally, also in the education necessary for the EMS provider. In 1996 the *EMS Agenda for the Future* (the *Agenda*) released a vision statement for integration of EMS into the healthcare system. From that point to the publishing of the National Emergency Medical Services Education Standards in 2009, there have been many elements incorporated into the education system proposed by the *Agenda*. The vision for EMS education in the *Agenda* included that which “employs sound educational principles,” “based on research,” and “conducted by qualified instructors.”

This committee undertook the task of comparing the 2006 EMT-Basic WI Practice Based curriculum to these Education Standards. The goal, then, was to revise the 2006 version as it was merged with the new content from the Education Standards. It is desired that the outcome of this project will assist the qualified EMS educator in providing sound EMS education. This is the final product of those efforts.

Much of the curriculum looks the same. Wisconsin continues to include practice based/critical thinking in EMT education, realizing the value of these components. It is a given that qualified educators and adequate instructional staff will be used to ensure student competencies are met and safety in the classroom is maintained.

Changes

However, there are also major changes noted in this revision. The length and rigor of EMT training has increased. Greater emphasis is now placed on anatomy, physiology and pathophysiology. To assist those that use this document, material not previously included or changes in the format are represented in red type.

The Education Standards indicate that course length should be based on competencies, not hours. This committee estimates that the content of this curriculum can be adequately delivered in a maximum of 180 hours, possibly less.

The Education Standards provide for 10 clinical patient assessments compared to the 5 patient contacts in the 2006 curriculum. It is suggested by the Standards that these be accomplished in an emergency department, ambulance, clinic, nursing home, doctor’s

office or on standardized patients if clinical settings are not available. Also, in a program approved by the medical director and program director, students must participate in and document their patient contacts in field experience.

It is also suggested by this committee that all portions of the didactic content be considered for alternative delivery methods. Nationwide, EMS education is being presented in multiple formats-asynchronous as well as synchronous instruction, co- and pre-requisites, face-to-face instruction. It is desired that Wisconsin EMS training centers wishing to use alternative formats receive permission to participate in this trend.

Future

With the disappearance of the National Standard Curriculum and the replacement of this with the Education Standards, Wisconsin should experience increased flexibility in the delivery of quality EMT education along with the potential to make changes as necessary. It will no longer be necessary to wait for a national curriculum change.

This will enable educators and providers to keep pace with the Scope of Practice and the ever-advancing profession of Emergency Medical Services. Keeping abreast of these changes and still staying within a national standard allows for greater understanding across state boundaries and from system to system. With the use of this document and the other components of the *Agenda*, it is anticipated that Wisconsin's EMS education will continue to be of the high quality necessary to bring entry-level EMTs to the prehospital arena.

MODULE 1

Preparatory

Lesson 1-1

Introduction to Emergency Care

OBJECTIVES

OBJECTIVES LEGEND

C=Cognitive P=Psychomotor A=Affective

1 = Knowledge level

2 = Application level

3 = Problem-solving level

COGNITIVE OBJECTIVES

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

- 1-1.1 Define Emergency Medical Services (EMS) systems. (C-1)
- 1-1.2 Identify the importance of the National EMS Education Agenda for the Future as it pertains to the EMT. (C-1)
- 1-1.3 Differentiate the roles and responsibilities of the EMT from other pre-hospital care providers. (C-3)
- 1-1.4 Describe the roles and responsibilities related to personal safety. (C-1)
- 1-1.5 Discuss the roles and responsibilities of the EMT towards the safety of the crew, the patient and bystanders. (C-2)
- 1-1.6 Describe the process of critical thinking as it pertains to the roles and responsibilities of the EMT (C-1)
- 1-1.7 Define quality improvement and discuss the EMT's role in the process. (C-1)
- 1-1.8 Describe how the actions of one crew member can affect those of others. (C-2)
- 1-1.9 Define medical direction and discuss the EMT's role in the process. (C-1)
- 1-1.10 State the specific statutes and regulations in your state regarding the EMS system. (C-1)
- 1-1.11 Explain employer policies and procedures pertaining to the EMT. (C-1)
- 1-1.12 Identify the role of public health as it pertains to the EMT. (C-1)

AFFECTIVE OBJECTIVES

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

- 1-1.13 Assess areas of personal attitude and conduct of the EMT. (A-3)
- 1-1.14 Characterize the various methods used to access the EMS system in your community. (A-3)
- 1-1.15 Value the need for evidence-based research. (A-3)

PSYCHOMOTOR OBJECTIVES

No psychomotor objectives identified.

PRESENTATIONDeclarative (What)

- I. Course Overview
 - A. Paperwork
 - 1. Local
 - 2. State
 - B. Course description and expectations
 - C. Immunizations/physical exam
 - D. Review criteria for certification
 - 1. Successful course completion
 - 2. Mentally/physically meet criteria of safe and effective practice of job functions
 - 3. Written examination
 - 4. Practical examination
 - 5. State and local provisions
 - E. Implications of Americans with Disabilities Act (ADA) - state and local policies
 - F. Implications of harassment - state and local policies
- II. The Emergency Medical Services System and the Emergency Medical Technician
 - A. Overview of the Emergency Medical Services system
 - 1. National Highway Traffic Safety Administration Technical Assistance Program Assessment Standards
 - a. Regulation and policy
 - b. Resource management
 - c. Human resources and training
 - d. Transportation
 - e. Facilities
 - f. Communications
 - g. Public information and education
 - h. Medical direction
 - i. Trauma systems
 - j. Evaluation
 - 2. Access to the system
 - a. 9-1-1
 - b. Non 9-1-1
 - 3. **Education**
 - a. Levels of training (current use and potential changes in training and titles)
 - (1) First Responder (Emergency Medical Responder)
 - (2) EMT-Basic (EMT)
 - (3) Intermediate Technician (WI)
 - (4) **AEMT**
 - (5) EMT-Intermediate
 - (6) EMT-Paramedic (Paramedic)

- b. **National EMS Education Agenda for the Future: A Systems Approach**
 - 4. The health care system
 - a. Emergency departments
 - b. Specialty facilities
 - (1) Trauma centers
 - (2) Burn centers
 - (3) Pediatric centers
 - (4) Poison centers
 - (5) Other specialty centers - locally dependent
 - c. **Home Healthcare providers**
 - 5. Hospital personnel
 - a. Physicians
 - b. Nurses
 - c. Other health professionals
 - 6. Liaison with other public safety workers
 - a. Local law enforcement
 - b. State and federal law enforcement
 - c. **Emergency Management**
 - 7. Overview of the local EMS system
- B. Roles and Responsibilities of the EMT
- 1. Gather, analyze and process information to determine an appropriate course of action in managing (thinking critically about)
 - a. Personal safety
 - b. Safety of crew, patient and bystanders
 - c. **Provide scene leadership**
 - d. Patient assessment
 - e. Patient care based on assessment findings
 - f. **Provide emotional support to patients, patient's family, other responders**
 - g. Lifting and moving patients safely
 - h. Transport/transfer of care
 - i. **Integration with other professionals and continuity of care**
 - (1) **Medical personnel**
 - (2) **Law enforcement**
 - (3) **Emergency management**
 - (4) **Home healthcare providers**
 - (5) **Other responders**
 - j. **Patient Safety**
 - (1) **Significant – one of the most urgent health care challenges**
 - (2) **High-risk activities**
 - (a) **Hand-off**
 - (b) **Communication issues**
 - (c) **Dropping patients**
 - (d) **Ambulance crashes**

- (e) Spinal immobilization
- (3) How errors happen
 - (a) Skills-based failure
 - (b) Rules-based failure
 - (c) Knowledge-based failure
- (4) Preventing errors
 - (a) Environmental
 - i) Clear protocols
 - ii) Light
 - iii) Minimal interruptions
 - iv) Organization and packaging of drugs
 - (b) Individual
 - i) Reflection in action
 - ii) Constantly question assumptions
 - iii) Reflection bias
 - iv) Utilize decision aids
 - v) Ask for help
- 2. Maintain comprehensive response information and patient care data
 - a. Record keeping/data collection
 - b. Patient advocacy (patient rights)
- 3. Maintain certification and licensure
 - a. Personal responsibility
 - b. Continuing education
 - c. Skill competency verification
 - d. Criminal implications
 - e. Fees
- C. Professional attributes
 - 1. Appearance
 - a. Neat
 - b. Clean
 - c. Positive image
 - 2. Maintains up-to-date knowledge and skills
 - a. Continuing education
 - b. Refresher courses
 - 3. Places patient's needs as a priority, without endangering self
 - 4. Maintains current knowledge of local, state, and national issues affecting EMS
 - 5. Professionalism
 - a. Integrity
 - b. Empathy
 - c. Self-motivation
 - d. Self-confidence
 - e. Time management
 - f. Teamwork and diplomacy

- g. Respect for patients, co-workers and other healthcare professionals
- h. Patient advocacy
- D. Quality improvement
 - 1. Definition - a system of internal/external reviews and audits of all aspects of an EMS system so as to identify those aspects needing improvement to assure that the public receives the highest quality of prehospital care
 - 2. The role of the EMT in quality improvement
 - a. Documentation
 - b. Run reviews and audits
 - c. Gathering feedback from patients and hospital staff
 - d. Conducting preventative maintenance
 - e. Continuing education
 - f. Skill maintenance
- E. Medical direction
 - 1. Definition
 - a. A physician responsible for the clinical and patient care aspects of an EMS system
 - b. Every ambulance service/rescue squad must have physician medical direction
 - c. Types of medical direction
 - (1) On-line
 - (a) Telephone
 - (b) Radio
 - (2) Off-line
 - (a) Protocols
 - (b) Standing orders
 - d. Responsible for reviewing quality improvement
 - 2. The relationship of the EMT to medical direction
 - a. Designated agent of the physician
 - b. Care rendered is considered an extension of the medical director's authority (varies by state law)
- F. Specific statutes and regulations regarding EMS in your state
- G. Employer policies and procedures
- H. Evidence-based decision-making
 - 1. Traditional medical practice is based on
 - a. Medical knowledge
 - b. Intuition
 - c. Judgment
 - 2. High-quality patient care should focus on procedures proven useful in improving patient outcomes
 - 3. The challenge for EMS is the relative lack of prehospital research
 - 4. Evidence-based decision-making techniques
 - a. Formulate a question about appropriate treatments
 - b. Search medical literature for related research

- c. Appraise evidence for validity and reliability
 - d. If evidence supports a change in practice, adopt the new therapy allowing for unique patient needs
- I. Basic principles of public health
- 1. Role of public health
 - a. Many definitions
 - b. Public health mission and functions
 - c. Public health differs from individual patient care
 - d. Review accomplishments of public health
 - (1) Widespread vaccinations
 - (2) Clean drinking water and sewage systems
 - (3) Declining infectious disease
 - (4) Fluoridated water
 - (5) Reduction in use of tobacco products
 - (6) Prenatal care
 - 2. Public health laws, regulations, and guidelines
 - 3. EMS interface with public health
 - a. EMS is a public health system
 - (1) EMS provides a critical public health function
 - (2) Incorporate public health services into EMS system
 - (3) Collaborations with other public health agencies
 - b. Roles for EMS in public health
 - (1) Health prevention and promotion
 - (a) Primary - preventing disease development
 - i) Vaccination
 - ii) Education
 - (b) Secondary - preventing complications and/or progression of disease
 - (c) Health screenings
 - (2) Disease surveillance
 - (a) EMS providers are first line care givers
 - (b) Patient care reports may provide information on epidemics of disease
 - c. Injury prevention
 - (1) Safety equipment
 - (2) Education
 - (a) Car seat safety
 - (b) Seat belt use
 - (c) Helmet use
 - (d) Driving under the influence
 - (e) Falls
 - (f) Fire
 - (g) Injury surveillance

MODULE 1

Preparatory

Lesson 1-2

Workforce Safety and Wellness

OBJECTIVES

OBJECTIVES LEGEND

C=Cognitive P=Psychomotor A=Affective

1 = Knowledge level

2 = Application level

3 = Problem-solving level

COGNITIVE OBJECTIVES

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

- 1-2.1 List possible emotional reactions that the EMT may experience when faced with trauma, illness, death and dying. (C-1)
- 1-2.2 Discuss the possible reactions that a family member may exhibit when confronted with death and dying. (C-1)
- 1-2.3 State the steps in the EMT's approach to the family confronted with death and dying. (C-1)
- 1-2.4 State the possible reactions that the family of the EMT may exhibit due to their outside involvement in EMS. (C-1)
- 1-2.5 **Identify the types of stress reactions. (C-1)**
- 1-2.6 State possible steps that the EMT may take to help reduce/alleviate stress. (C-1)
- 1-2.7 **Define critical incident stress management (CISM). (C-1)**
- 1-2.8 **Identify principles of physical and mental well-being. (C-1)**
- 1-2.9 **List the causes of infectious disease. (C-1)**
- 1-2.10 **Discuss the importance of standard precautions. (C-1)**
- 1-2.11 Describe the steps the EMT should take for personal protection from airborne and bloodborne pathogens. (C-1)
- 1-2.12 Discuss the importance of obtaining and maintaining appropriate immunizations. (C-1)
- 1-2.13 List the immunizations that an EMT should have and maintain. (C-1)
- 1-2.14 List the personal protective equipment necessary for each of the following situations: (C-1)
 - Hazardous materials
 - Rescue operations
 - Violent scenes
 - Crime scenes
 - Exposure to bloodborne pathogens
 - Exposure to airborne pathogens
- 1-2.15 **Describe procedure involved in cleaning equipment. (C-1)**
- 1-2.16 **Describe procedure involved in disposal of contaminated supplies, including sharps. (C-1)**
- 1-2.17 **Describe procedure involved in decontaminating the ambulance. (C-1)**
- 1-2.18 Describe the steps an EMT needs to take in the event of a suspected significant body substance exposure. (C-1)
- 1-2.19 **Discuss ways to prevent work-related injuries. (C-1)**

AFFECTIVE OBJECTIVES

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

- 1-2.20 Explain the rationale for serving as an advocate for the use of appropriate protective equipment. (A-3)

PSYCHOMOTOR OBJECTIVES

- 1-2.21 Given a scenario with potential infectious exposure, the EMT will use appropriate personal protective equipment. At the completion of the scenario, the EMT will properly remove and discard the protective garments. (P-1, 2)
- 1-2.22 Given the above scenario, the EMT will complete disinfection/cleaning and all reporting documentation. (P-1, 2)

PRESENTATION**Declarative (What)**

- I. Emotional Aspects of Emergency Care
- A. Death and dying
1. Stages
 - a. Denial
 - b. Anger
 - c. Bargaining
 - d. Depression
 - e. Acceptance
 2. Dealing with the dying patient and family members
 - a. Anticipate the needs of the patient
 - (1) Patient needs include dignity, respect, sharing, communication, privacy and control
 - (2) Family members may express rage, anger and despair
 - (3) Listen empathetically
 - (4) Do not falsely reassure
 - (5) Use a gentle tone of voice
 - (6) Let the patient know everything that can be done to help will be done
 - (7) Use a reassuring touch, if appropriate
 - b. Anticipate the needs of the family, friends & by-standers
 - (1) Comfort the family
 - (2) Consult appropriate resources to assist in managing issues
- B. Stressful situations
1. Examples of situations that may produce a stress response
 - a. Mass casualty situations
 - b. Infant and child trauma
 - c. Amputations

- d. Infant/child/elder/spouse abuse
- e. Death/injury of co-worker or other public safety personnel
2. The EMT will experience personal stress as well as encounter patients and bystanders in severe stress
- C. Stress management
 1. Types of stress reactions
 - a. Acute stress reaction
 - b. Delayed stress reaction
 - c. Cumulative stress reaction
 2. Stress management
 - a. Change in lifestyle
 - b. Balance in life
 - c. Recognize response to family and friends
 - d. Change in work environment
 - e. Seek professional assistance
- D. Critical incident stress management (CISM)
 1. A team of peer counselors and mental health professionals who help emergency care workers deal with critical incident stress
 2. Meeting is held within 24 to 72 hours of a major incident
 - a. Open discussion of feelings, fears, and reactions
 - b. Not an investigation or interrogation
 - c. All information is confidential
 - d. CISM leaders and mental health personnel evaluate the information and offer suggestions on overcoming the stress
 3. Designed to accelerate the normal recovery process after experiencing a critical incident
 - a. Works well because feelings are ventilated quickly
 - b. Debriefing environment is non-threatening
 4. How to access local CISM system
- E. Comprehensive critical incident stress management includes:
 1. Pre-incident stress education
 2. On-scene peer support
 3. One-on-one support
 4. Disaster support services
 5. Defusing sessions
 6. CISD
 7. Follow up services
 8. Spouse/family support
 9. Community outreach programs
 10. Other health and welfare programs such as wellness programs
- F. Wellness principles
 1. Physical well-being
 - a. Physical fitness
 - (1) Cardiovascular endurance
 - (2) Muscle strength
 - (3) Muscle flexibility

- b. Sleep
 - c. Disease prevention
 - d. Injury prevention
 - 2. Mental well-being
 - a. Alcohol and drug issues
 - b. Smoking cessation
 - c. Stress management
 - d. Relationship issues
- II. Causes of infectious disease
 - A. Infectious agents
 - 1. Bacteria
 - 2. Viruses
 - 3. Fungi
 - 4. Protozoa
 - 5. Helminths (worms)
- III. Standard precautions (body substance isolation, personal protective equipment) and cleaning and disposing of equipment and supplies
 - A. Body substance isolation (BSI) (Bio-Hazard)
 - 1. EMT's and patient's safety
 - a. Hand washing
 - b. Eye protection
 - c. Gloves (vinyl)– for patient contact
 - d. Gloves (utility) - for cleaning vehicles and equipment
 - e. Gowns
 - f. Masks
 - (1) Surgical type for possible blood splatter High Efficiency Particulate Air (HEPA) respirator if patient suspected for or diagnosed with tuberculosis (worn by care provider)
 - (2) Airborne disease - surgical type mask (worn by patient)
 - g. Requirements and availability of specialty training
 - 2. OSHA/state regulations regarding BSI
 - 3. Statutes/regulations reviewing notification and testing in an exposure incident
 - 4. State and local protocols define specific steps an EMT needs to take in the event of a significant body substance exposure
 - B. Personal protection
 - 1. Hazardous materials
 - a. Identify possible hazards
 - (1) Binoculars
 - (2) Placards
 - (3) *Hazardous Materials, The Emergency Response Handbook*, published by the United States Department of Transportation
 - b. Protective clothing

- (1) Hazardous material suits
 - (2) Self contained breathing apparatus
 - c. Hazardous materials scenes are controlled by specialized HazMat teams
 - d. EMTs provide emergency care only after the scene is safe and patient contamination limited
 - e. Requirements and availability of specialized training
 - 2. Rescue
 - a. Identify and reduce potential life threats
 - (1) Electricity
 - (2) Fire
 - (3) Explosion
 - (4) Hazardous materials
 - b. Protective clothing
 - (1) Turnout gear
 - (2) Puncture-proof gloves
 - (3) Helmet
 - (4) Eye wear
 - c. Dispatch rescue teams for extensive/heavy rescue
 - 3. Violence
 - a. Scene should always be controlled by law enforcement before EMT provides patient care
 - (1) Perpetrator of the crime
 - (2) Bystanders
 - (3) Family members
 - b. Behavior at crime scene (covered in greater detail in Medical/Legal and Ethical Issues)
 - (1) Do not disturb the scene unless required for medical care
 - (2) Maintain chain of evidence
- IV. Recommendations for cleaning or sterilization of equipment
- V. Recommendations for disposing of contaminated linens and supplies, including sharps
- VI. Recommendations for decontaminating the ambulance
- VII. Exposure of health care provider
 - A. Current recommended treatment modalities and follow-up
 - B. Prevention of exposure or immunizations/vaccines
 - 1. Tetanus prophylaxis
 - 2. Hepatitis B vaccine
 - 3. Verification of immune status with respect to commonly transmitted contagious diseases
 - 4. Access or availability of immunizations in the community
 - 5. Tuberculin purified protein derivative (PPD) testing
- VIII. Prevention of work-related injuries
 - A. Vehicle restraint systems
 - B. Safe lifting techniques

- C. Adequate sleep
- D. Physical fitness and nutrition
- E. Hazard awareness
- F. Adherence to standard precautions/OSHA regulations
- G. Disease transmission prevention
 - 1. Communicable
 - 2. Blood borne

MODULE 1

Preparatory

Lesson 1-3

Medical/Legal and Ethical Issues

OBJECTIVES

OBJECTIVES LEGEND

C=Cognitive P=Psychomotor A=Affective

1 = Knowledge level

2 = Application level

3 = Problem-solving level

COGNITIVE OBJECTIVES

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

- 1-3.1 Define the EMT scope of practice. (C-1)
- 1-3.2 Explain the rationale for the need, benefits and use of advance directives, such as Do Not Resuscitate [DNR] orders, living wills, and power of attorney for health care as they pertain to EMS. (C-2)
- 1-3.3 Define consent and discuss the methods of obtaining consent. (C-1)
- 1-3.4 Differentiate between expressed, implied **and in loco parentis** consent. (C-3)
- 1-3.5 Explain the role of consent of minors in providing care. (C-1)
- 1-3.6 Discuss the implications for the EMT in patient refusal of transport. (C-1)
- 1-3.7 Discuss the issues of abandonment, negligence, assault, battery, **and false imprisonment.** (C-1)
- 1-3.8 State the conditions necessary for the EMT to have a duty to act. (C-1)
- 1-3.9 Explain the importance, necessity and legality of patient confidentiality. (C-1)
- 1-3.10 Explain how the Health Insurance Portability and Accountability Act (HIPAA privacy rule) relates to patient confidentiality and prehospital emergency care. (C-1)
- 1-3.11 Discuss the considerations of the EMT in issues of organ retrieval. (C-1)
- 1-3.12 Differentiate the actions that an EMT should take to assist in the preservation of a crime scene. (C-3)
- 1-3.13 State the conditions that require an EMT to notify local law enforcement officials (**mandatory reporting**). (C-1)

AFFECTIVE OBJECTIVES

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

- 1-3.14 Explain the role of EMS and the EMT regarding patients with DNR orders. (A-3)
- 1-3.15 Explain the rationale for the needs, benefits and usage of advance directives. (A-3)
- 1-3.16 Explain the rationale for the concept of varying degrees of DNR. (A-3)
- 1-3.17 Values the importance of maintaining patient confidentiality. (A-2)

PSYCHOMOTOR OBJECTIVES

No psychomotor objectives identified.

PRESENTATIONDeclarative (What)

- I. Scope of Practice
 - A. Legal duties to the patient, medical director, and public
 1. Provide for the well-being of the patient by rendering necessary interventions outlined in the scope of practice
 2. Defined by state legislation
 - a. Enhanced by medical direction through the use of protocols and standing orders
 - b. Referenced to the National Standard Curricula
 3. Legal right to function as an EMT may be contingent upon medical direction
 - a. Telephone/radio communications
 - b. Approved standing orders/protocols
 - c. Responsibility to medical direction
 - B. Ethical principles and moral obligations – study of morality; concept of right and wrong
 1. Make the physical/emotional needs of the patient a priority
 2. Practice/maintenance of skills to the point of mastery
 3. Attend continuing education/refresher programs
 4. Critically review performances, seeking ways to improve response time, patient outcome, communication
 5. Honesty in reporting
 6. Ethical conflicts
 - a. Futility of care (cardiac arrest in the wilderness)
 - b. Allocation of limited resources – medical rationing (triage)
 - c. Professional misconduct (patient abuse)
 - d. Economic triage – patient dumping
- II. Advance Directives
 - A. Do Not Resuscitate (DNR) orders
 1. Patient has the right to refuse resuscitative efforts
 2. In general, requires written order from physician
 3. Review state and local legislation/protocols relative to DNR orders and advance directives
 4. When in doubt or when written orders are not present, the EMT should begin resuscitation efforts
 5. Applies to individuals 18 years of age and older
 6. Contact Medical Control regarding pediatric DNR order compliance
 - B. Power of Attorney for Health Care
 - C. Living Will
- III. Consent
 - A. Expressed
 1. Patient must be of legal age and able to make a rational decision
 2. Patient must be informed of the steps of the procedures and all related risks

3. Must be obtained from every conscious, mentally competent adult before rendering treatment
 - B. Implied
 1. Consent assumed from the unconscious patient requiring emergency intervention
 2. Based on the assumption that the unconscious patient would consent to life saving interventions
 - C. Children and mentally incompetent adults
 1. Consent for treatment must be obtained from the parent or legal guardian
 - a. Emancipation issues
 - b. State regulations regarding age of minors
 2. When life threatening situations exist and the parent or legal guardian is not available for consent, emergency treatment should be rendered based on implied consent
 3. **In loco parentis**
 - a. **Legal responsibility of person/organization taking on some functions/responsibilities of a parent**
- IV. Refusals
- A. The patient has the right to refuse treatment
 - B. The patient may withdraw from treatment at any time. Example: an unconscious patient regains consciousness and refuses transport to the hospital.
 - C. Refusals must be made by mentally competent adults following the rules of expressed consent
 - D. The patient must be informed of and fully understand all the risks and consequences associated with refusal of treatment/transport, and must sign a "release from liability" form
 - E. **Against medical advice**
 1. **Due diligence**
 - a. **Standard of care**
 - b. **Medical control**
 - F. When in doubt, err in favor of providing care
 - G. Documentation is a key factor to protect EMT in refusal
 1. Competent adult patients have the right to refuse treatment
 2. Before the EMT leaves the scene, he should:
 - a. Try again to persuade the patient to go to a hospital
 - b. Ensure the patient is able to make a rational, informed decision, e.g., not under the influence of alcohol or other drugs, or illness/injury effects
 - c. Inform the patient why he should go and what may happen to him if he does not
 - d. Consult medical direction as directed by local protocol
 - e. Consider assistance of law enforcement

- f. Document any assessment findings and emergency medical care given, and if the patient still refuses, then have the patient sign a refusal form
 - g. The EMT should never make an independent decision not to transport
- V. Abandonment - termination of care of the patient without assuring the continuation of care at the same level or higher
- VI. **Civil Tort (Concept of Negligence)** - deviation from the accepted standard of care resulting in further injury to the patient.
- A. **Res Ipsa Loquitur** – EMT or EMS service held liable even when plaintiff is unable to prove how injury occurred
 - B. **Negligence per se** – theory used when a person being sued is alleged to have occurred in violation with a statute of law
 - C. **Elements of Negligence**
 - 1. **Duty to act**
 - a. A contractual or legal obligation must exist
 - (1) **Implied**
 - (a) Patient calls for an ambulance and the dispatcher confirms that an ambulance will be sent
 - (b) Treatment is begun on a patient
 - (2) **Formal** - ambulance service has a written contract with a municipality. Specific clauses within the contract should indicate when service can be refused to a patient.
 - 2. **Breach of the duty**
 - 3. **Injury/damage to plaintiff**
 - a. **Physical (e.g. loss of earnings/disability)**
 - b. **Psychological (e.g. pain and suffering)**
 - c. **Punitive**
 - 4. **Proximate causation** - actions of the EMT caused the injury/damage
 - 5. **Foreseeability** - could a reasonable and prudent EMT anticipate that injury/damage could occur as the result of their action(s) or inaction
 - 6. **Defenses**
 - a. **Good Samaritan**
 - b. **Governmental immunity**
 - c. **Statute of limitations**
 - d. **Contributory negligence**
 - 7. **Protection from liability and loss**
 - a. **Professionalism**
 - b. **Standard of care**
 - c. **Liability insurance**
- VII. **Breaches of Conduct**

- A. Assault and Battery - threatened (**assault**) or actual (**battery**), unlawful touching of a person without the person's consent
 - B. **False Imprisonment** - providing emergency care when the patient does not consent to the treatment
 - C. **Kidnapping**
- VIII. Confidentiality
- A. Confidential information
 1. Patient history gained through interview
 2. Assessment findings
 3. Treatment rendered
 - B. Releasing confidential information
 1. Requires a written release form signed by the patient. Do not release on request, written or verbal, unless legal guardianship has been established.
 2. When a release is not required
 - a. Other health care providers need to know information to continue care
 - b. State law requires reporting incidents such as rape, abuse or gun shot wounds
 - c. Third party payment billing forms
 - d. Legal subpoena
 - C. Health Insurance Portability and Accountability Act (HIPAA Privacy Rule)
 1. Created to protect the privacy of patient medical records
 2. Identifies how healthcare providers (including EMTs) are to behave when using or disclosing patient data
 3. Stipulates requirements on ambulance service providers
 - a. Patient notification of their privacy rights
 - b. Patient permission to disclose information, in advance
 - c. Patient permission must be in writing
 - d. Training required on behalf of service providers to their EMTs
 4. Allowable disclosures
 - a. Protected health information for treatment, payment and certain health care operations of another covered entity
 5. Exceptions to the Privacy Rule
 - a. Disclosures required by law
 - b. Disclosures related to public health
 - c. Reports to government agencies of abuse, neglect or domestic violence
 - d. Disclosures made to law enforcement
 - e. Disclosures for Worker's Compensation
 - f. Disclosures for organ donation or transplantation
 - g. Disclosures to coroners and medical examiners
 6. Violations of HIPAA regulations
 - a. Civil penalties
 - b. Criminal penalties

- D. **Social media**
 - 1. **Facebook**
 - 2. **Twitter**
 - 3. **Texting**
 - 4. **Blogging**
 - 5. **Other**
- IX. Special situations
 - A. Donor/organ harvesting consideration
 - 1. Requires a signed legal permission document
 - a. Separate donor card
 - b. Intent to be a donor on the reverse of patient's driver's license
 - 2. A potential organ donor should not be treated differently from any other patient requesting treatment
 - 3. EMT's role in organ harvesting
 - a. Identify the patient as a potential donor
 - b. Establish communication with medical direction
 - c. Provide care to maintain viable organs
 - B. Medical identification insignia
 - 1. Bracelet, necklace, card
 - 2. Indicates a serious medical condition of the patient
 - a. Allergies
 - b. Diabetes
 - c. Epilepsy
 - d. Others
- X. Potential crime scene/evidence preservation
 - A. Dispatch should notify police personnel
 - B. Responsibility of the EMT
 - 1. Emergency care of the patient is the EMT's priority
 - 2. Do not disturb any item at the scene unless emergency care requires it
 - 3. Observe and document anything unusual at the scene
 - 4. If possible, do not cut through holes in clothing from gunshot wounds or stabbings
- XI. **Mandatory reporting**
 - A. Established by state legislation and may vary from state to state
 - B. **Legally compelled to notify authorities**
 - 1. Suspicion of abuse/neglect
 - a. Child
 - b. Elderly
 - 2. Crime
 - a. Wounds obtained by violent crime
 - b. **Domestic violence**
 - c. Sexual assault
 - d. **Penetrating trauma**
 - (1) **Gunshot**

- (2) Stab wounds
- 3. Communicable disease exposure
 - a. Reportable infectious disease
 - b. Animal bites
- C. Patient restraint laws e.g. forcing someone to be transported against their will.
- D. Mentally incompetent, e.g., intoxication with injuries
- E. Child abandonment - "Safe Place for Newborns" - Wisconsin Statute allows for newborn to be left in care of EMTs (www.safeplacefornewborns.com/statefiles/wi)
- F. Legal liability for failure to report

MODULE 1

Preparatory

Lesson 1-4

Overview of the Human Body and Physiology

OBJECTIVES

OBJECTIVES LEGEND

C=Cognitive P=Psychomotor A=Affective

1 = Knowledge level

2 = Application level

3 = Problem-solving level

COGNITIVE OBJECTIVES

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

1-4.1 Identify the topographical anatomy and directional terms utilized by the EMT. (C-1)

1-4.2 List the components of each of the major body systems. (C-1)

1-4.3 List the elements of the life support chain. (C-1)

1-4.4 Acquire a basic understanding of common Latin medical terminology. (C-1)

AFFECTIVE OBJECTIVES

No affective objectives identified.

PSYCHOMOTOR OBJECTIVES

No psychomotor objectives identified.

PRESENTATION

Declarative (What)

- I. Topographical anatomy and directional terms
 - A. Normal anatomical position
 - B. Anatomical terms
 1. Frontal or coronal plane
 2. Sagittal or lateral plane
 3. Transverse or axial plane
 4. Midline
 5. Mid-axillary
 6. Mid-clavicular
 - C. Directional and positional terms
 1. Medial and lateral
 2. Proximal and distal
 3. Superior and inferior
 4. Anterior and posterior
 5. Right and left
 6. Unilateral and bilateral
 7. Dorsal and ventral
 8. Plantar

9. Palmar
 10. Prone and supine
 11. Fowlers and Semi-Fowlers
 12. Trendelenburg
 13. Shock position
 14. Lateral recumbent/recovery
- II. **Body Systems**
- A. **Skeletal**
1. **Components**
 - a. Skull
 - b. Face
 - c. Vertebral column
 - d. Thorax
 - e. Pelvis
 - f. Upper extremities
 - g. Lower extremities
 2. **Joints**
 3. **Function**
- B. **Muscular**
1. **Types**
 - a. Skeletal
 - b. Smooth
 - c. Cardiac
 2. **Function**
- C. **Respiratory system**
1. **Structures**
 - a. **Upper airway**
 - (1) Nose
 - (2) Mouth/teeth
 - (3) Tongue/jaw
 - (4) Nasopharynx
 - (5) Oropharynx
 - (6) Epiglottis
 - (7) Larynx
 - b. **Lower airway**
 - (1) Trachea
 - (2) Bronchi
 - (3) Bronchioles
 - (4) Alveoli
 - c. **Structures that support ventilation**
 - (1) Chest wall
 - (2) Pleura
 - (3) Diaphragm
 - (4) Intercostal muscles
 - (5) Phrenic nerve
 - (6) Pulmonary capillaries

2. Anatomic differences between pediatric and adult airways
 3. Function
 - a. Ventilation
 - b. Respiration
 - c. Alveolar/capillary gas exchange
 - d. Buffer
- D. Circulatory system
1. Structures
 - a. Heart
 - (1) Chambers
 - (2) Coronary arteries
 - b. Arterial
 - (1) Aorta
 - (2) Arteries
 - (3) Arterioles
 - c. Capillaries
 - (1) Pulmonary
 - (2) Tissue/cells
 - d. Venous
 - (1) Venae cava
 - (2) Veins
 - (3) Venules
 2. Blood components
 - (1) Red blood cells (RBCs)
 - (2) White blood cells (WBCs)
 - (3) Platelets (clotting factors)
 - (4) Plasma
 3. Function
 - (1) Perfusion
 - (2) Tissue/cell gas exchange
 - (3) Reservoir
 - (4) Blood buffer
 - (5) Infectious response
 - (6) Coagulation
- E. Nervous system
1. Structural division
 - a. Central nervous system (CNS)
 - (1) Brain
 - (2) Spinal cord
 - b. Peripheral nervous system (PNS)
 2. Functional
 - a. Autonomic
 - (1) Sympathetic nervous system (SNS)
 - (a) Neural mechanism/pathways
 - (b) Hormonal
 - i) Epinephrine

- ii) **Norepinephrine**
 - (c) Fight or flight response
 - (d) Opposes the response seen with the Parasympathetic NS
 - (2) **Parasympathetic nervous system (PNS)**
 - (a) **Neural mechanism/pathways**
 - (b) **Hormonal - Acetylcholine**
 - (c) Feed and breed response
 - (d) Opposes the response seen with the sympathetic NS
 - b. **Consciousness**
 - (1) **Cerebral hemispheres**
 - (2) **Reticular activating system (center of consciousness)**
 - c. **Sensory function**
 - d. **Motor function**
- F. **Integumentary (skin)**
 - 1. **Structures/layers**
 - a. **Epidermis**
 - b. **Dermis**
 - c. **Subcutaneous**
 - 2. **Functions of the skin**
 - a. **Protection**
 - b. **Temperature control**
- G. **Digestive system**
 - 1. **Structures**
 - a. **Esophagus**
 - b. **Stomach**
 - c. **Intestines**
 - d. **Liver**
 - e. **Pancreas**
 - 2. **Function**
 - a. **Digestion**
- H. **Endocrine system**
 - 1. **Structures**
 - a. **Pancreas**
 - b. **Adrenal glands**
 - (1) **Epinephrine**
 - (2) **Norepinephrine**
 - 2. **Function**
 - a. **Control of blood glucose level**
 - b. **Stimulate sympathetic nervous system**
 - (1) **Receptors**
 - (2) **Beta 2 stimulation**
- I. **Renal system**
 - 1. **Structures**
 - a. **Kidneys**

- b. Bladder
 - c. Urethra
 - 2. Function
 - a. Blood filtration
 - b. Fluid balance
 - c. Buffer
 - J. Reproductive system
 - 1. Male
 - a. Structures
 - (1) Testicles
 - (2) Penis
 - b. Functions
 - (1) Reproduction
 - (2) Urination
 - (3) Hormones
 - 2. Female
 - a. Structures
 - (1) Ovaries
 - (2) Fallopian tubes
 - (3) Uterus
 - (4) Vagina
 - b. Functions
 - (1) Reproduction
 - (2) Hormones
- III. 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
 - (1) High ATP (energy) production
 - (2) Byproduct of water and carbon dioxide
 - b. Anaerobic metabolism
 - (1) Low ATP (energy) production
 - (2) Byproduct of lactic acid
 - B. Issues impacting 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
- IV. Medical Terminology
- A. Prefixes
 - B. Root Words
 - C. Suffixes
 - D. Combining Forms
- V. Medical Terms
- A. Associated with body structure
 - B. Associated with body systems
 - C. Associated with body direction or position
- VI. Standard medical abbreviations and acronyms

MODULE 1

Preparatory

Lesson 1-5

Pathophysiology

OBJECTIVES

OBJECTIVES LEGEND

C=Cognitive P=Psychomotor A=Affective

1 = Knowledge level

2 = Application level

3 = Problem-solving level

COGNITIVE OBJECTIVES

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

- 1-5.1 List the components of ambient air. (C-1)
- 1-5.2 Discuss airway patency and obstructions at various anatomic levels. (C-1)
- 1-5.3 Recognize the changes that occur in respiratory structures and/or function associated with respiratory compromise. (C-1)
- 1-5.4 Define minute ventilation. (C-1)
- 1-5.5 Describe the concept of alveolar ventilation. (C-1)
- 1-5.6 Discuss alterations in regulation of respiration due to medical or traumatic conditions. (C-1)
- 1-5.7 Describe ventilation/perfusion ratio and mismatch. (C-1)
- 1-5.8 Explain the concepts of perfusion and shock. (C-1)
- 1-5.9 Discuss cell hypoxia related to oxygen transport disturbances. (C-1)
- 1-5.10 Define hypercarbia. (C-1)
- 1-5.11 Identify the composition and distribution of blood. (C-1)
- 1-5.12 Define hydrostatic and plasma oncotic pressures. (C-1)
- 1-5.13 Discuss influences on myocardial effectiveness. (C-2)
- 1-5.14 Explain systemic vascular resistance. (C-1)
- 1-5.15 List the components of microcirculation. (C-1)
- 1-5.16 Relate blood pressure changes to cardiac output, systemic vascular resistance and baroreceptors. (C-1)
- 1-5.17 Compare aerobic and anaerobic metabolism and the effects of inadequate perfusion on cells. (C-3)

AFFECTIVE OBJECTIVES

No affective objectives identified.

PSYCHOMOTOR OBJECTIVES

No psychomotor objectives identified.

PRESENTATION

Declarative (What)

- I. Composition of Ambient Air
 - A. Oxygen

- B. Nitrogen
 - C. Carbon Dioxide
 - D. Fraction of Inspired Oxygen
 - E. Fraction of Delivered Oxygen
 - II. Patency of the airway
 - A. Anatomical considerations
 - B. Airway obstruction
 - 1. Various anatomic levels
 - a. Nasopharynx
 - b. Oropharynx
 - c. Pharynx
 - d. Larynx
 - e. Trachea
 - f. Bronchi
 - 2. Causes of obstruction
- III. Respiratory compromise
 - A. Changes in structure and/or function
 - 1. Anatomic boundaries of the thorax
 - 2. Pleural lining
 - 3. Muscles of ventilation
 - 4. Accessory muscles of ventilation
 - 5. Inhalation
 - a. Muscle activity
 - b. Changes in intrapleural and intrapulmonary pressures
 - c. Active process
 - 6. Exhalation
 - a. Muscle activity
 - b. Changes in intrapleural and intrapulmonary pressures
 - c. Passive process
 - 7. Minute ventilation
 - a. Tidal volume
 - b. Respiratory rate
 - 8. Alveolar ventilation
 - a. Tidal volume
 - b. Dead air space
 - c. Respiratory rate
 - 9. Signs of mechanical ventilation impairment
 - 10. Effects of inadequate tidal volume and respiratory rate
 - a. Minute ventilation
 - b. Alveolar ventilation
 - 11. Hypoxia caused by poor mechanical ventilation
- IV. Alteration in regulation of respiration due to medical or traumatic conditions
 - A. Chemoreceptors
 - B. Stretch receptors
 - C. Medulla rhythm centers

- D. Effects of arterial carbon dioxide and oxygen content on respiration rate and depth
- E. Hypoxia caused by respiratory regulation disturbance
- V. Ventilation/Perfusion (V/Q) ratio and mismatch
 - A. Apex of lung
 - B. Base of lung
 - C. Ventilation disturbance related to hypoxemia
 - D. Perfusion disturbance related to hypoxemia
- VI. Perfusion and shock
 - A. Oxygen
 - 1. Dissolve in plasma
 - 2. Attached to hemoglobin
 - B. Carbon dioxide
 - 1. Dissolved in plasma
 - 2. Attached to hemoglobin
 - 3. Bicarbonate
 - C. Alveolar/capillary gas exchange
 - 1. Oxygen
 - 2. Carbon dioxide
 - D. Cell/capillary gas exchange
 - 1. Oxygen
 - 2. Carbon dioxide
 - E. Cell hypoxia related to oxygen transport disturbance
 - F. Hypercarbia related to carbon dioxide transport disturbance
 - G. Blood volume
 - 1. Composition of blood
 - a. Plasma
 - b. Red blood cells
 - c. White blood cells
 - d. Platelets
 - 2. Distribution
 - a. Arteries
 - b. Arterioles
 - c. Capillaries
 - d. Venules
 - e. Veins
 - f. Heart
 - g. Pulmonary veins
 - 3. Hydrostatic pressure
 - 4. Plasma oncotic pressure
 - H. Myocardial effectiveness
 - 1. Cardiac output
 - a. Heart rate
 - b. Stroke volume
 - (1) preload
 - (2) myocardial contractility

- (3) afterload
 - c. Impairment of cardiac output
 - (1) high heart rates
 - (2) low heart rates
 - (3) low blood volume
 - (4) decrease in myocardial contractility
 - (5) high blood pressure
 - 2. Influence of autonomic nervous system on cardiac output
 - a. Sympathetic
 - (1) neural
 - (2) hormonal
 - (a) epinephrine
 - (b) norepinephrine
 - b. Parasympathetic
 - I. Systemic vascular resistance (SVR)
 - 1. Anatomy of the vessel
 - 2. Influence of autonomic nervous system on SVR
 - a. Sympathetic
 - b. Parasympathetic
 - 3. Effects of blood volume and vessel size on pressure inside the vessel
- VII. Microcirculation
 - A. True Capillaries
 - B. Arteriole-Venule Shunt
 - C. Influence on Capillaries
 - 1. Local
 - 2. Neural
 - 3. Hormonal
- VIII. Blood pressure
 - A. Cardiac output
 - B. Systemic vascular resistance
 - C. Baroreceptors
 - D. Effects of changes in cardiac output on blood pressure
 - 1. Increase in heart rate
 - 2. Decrease in heart rate
 - 3. Increase in stroke volume
 - 4. Decrease in stroke volume
 - E. Effects of changes in systemic vascular resistance on blood pressure
 - 1. Increase in SVR
 - 2. Decrease in SVR
 - F. Effects of changes of blood pressure on perfusion of cells
 - 1. Oxygen delivery
 - 2. Glucose delivery
- IX. Alteration of cell metabolism
 - A. Aerobic metabolism
 - 1. Glucose

2. Oxygen
 3. Energy (ATP) released
 4. Byproducts
 - a. Carbon dioxide
 - b. Water
- B. Anaerobic metabolism
1. Glucose
 2. Lack of oxygen
 3. Energy (ATP) released
 4. Byproducts
 - a. Lactic acid
 - b. Effects of acidic environment on cell structure and function
- C. Effects of inadequate perfusion on cells
1. Lack of glucose
 2. Lack of oxygen
 3. Lack of energy
 - a. Sodium/potassium pump shutdown
 - b. Cell membrane rupture
 - c. Cell death

MODULE 1

Preparatory

Lesson 1-6

Lifting and Moving Patients

OBJECTIVES

OBJECTIVES LEGEND

C=Cognitive P=Psychomotor A=Affective

1 = Knowledge level

2 = Application level

3 = Problem-solving level

COGNITIVE OBJECTIVES

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

- 1-6.1 Define body mechanics. (C-1)
- 1-6.2 Discuss the guidelines and safety precautions that need to be followed when lifting a patient. (C-1)
- 1-6.3 Describe the safe lifting of cots and stretchers. (C-1)
- 1-6.4 Describe the guidelines and safety precautions for carrying patients and/or equipment. (C-1)
- 1-6.5 Discuss one-handed carrying techniques. (C-1)
- 1-6.6 Describe correct and safe carrying procedures on stairs. (C-1)
- 1-6.7 State the guidelines for reaching and their application. (C-1)
- 1-6.8 Describe correct reaching for log rolls. (C-1)
- 1-6.9 State the guidelines for pushing and pulling. (C-1)
- 1-6.10 Discuss the general considerations of moving patients. (C-1)
- 1-6.11 State three situations that may require the use of an emergency move. (C-1)
- 1-6.12 Identify the following patient carrying devices:
 - Wheeled ambulance stretcher
 - Portable ambulance stretcher
 - Stair chair
 - Scoop stretcher
 - Long spine board
 - Basket stretcher
 - Flexible stretcher
 - Bariatric stretcher
 - Powered stretcher
 - Neonatal isolette (C-1)

AFFECTIVE OBJECTIVES

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

- 1-6.13 Explain the rationale for properly lifting and moving patients. (A-3)

PSYCHOMOTOR OBJECTIVES

- 1-6.14 Working with a partner, prepare each of the following devices for use, transfer a patient to the device, properly position the patient on the device, move the device to the ambulance and load the patient into the ambulance:

Wheeled ambulance stretcher
 Portable ambulance stretcher
 Stair chair
 Scoop stretcher
 Long spine board
 Basket stretcher
 Flexible stretcher
 Powered stretcher (P-1, 2)

- 1-6.15 Working with a partner, the EMT will demonstrate techniques for the transfer of a patient from an ambulance stretcher to a hospital stretcher. (P-1, 2)

PRESENTATION

Declarative (What)

- I. Body Mechanics
 - A. Lifting techniques
 1. Safety precautions
 - a. Use legs, not back, to lift
 - b. Keep weight as close to body as possible
 2. Guidelines for lifting
 - a. Consider weight of patient and need for additional help
 - b. Know physical ability and limitations.
 - c. Lift without twisting
 - d. Have feet positioned properly
 - e. Communicate clearly and frequently with partner
 3. Safe lifting of cots and stretchers. When possible use a stair chair instead of a stretcher if medically appropriate.
 - a. Know or find out the weight to be lifted
 - b. Use at least two people
 - c. Ensure enough help available. Use an even number of people to lift so that balance is maintained.
 - (1) Know or find out the weight limitations of equipment being used
 - (2) Know what to do with patients who exceed weight limitations of equipment
 - d. Using power-lift or squat lift position, keep back locked into normal curvature. The power-lift position is useful for individuals with weak knees or thighs. The feet are a comfortable distance apart. The back is tight and the abdominal muscles lock the back in a slight inward curve. Straddle the object. Keep feet flat. Distribute weight to balls of feet or just behind them. Stand by making sure the back is locked in and the upper body comes up before the hips.
 - e. Use power grip to get maximum force from hands. The palm and fingers come into complete contact with the object and

all fingers are bent at the same angles. The power-grip should always be used in lifting. This allows for maximum force to be developed. Hands should be at least 10 inches apart.

- f. Lift while keeping back in locked-in position
 - g. When lowering cot or stretcher, reverse steps
 - h. Avoid bending at the waist
- B. Carrying
- 1. Precautions for carrying - whenever possible, transport patients on devices that can be rolled
 - 2. Guidelines for carrying
 - a. Know or find out the weight to be lifted
 - b. Know limitations of the crew's abilities
 - c. Work in a coordinated manner and communicate with partners
 - d. Keep the weight as close to the body as possible
 - e. Keep back in a locked-in position and refrain from twisting
 - f. Flex at the hips, not the waist; bend at the knees
 - g. Do not hyperextend the back (do not lean back from the waist)
 - 3. Correct carrying procedure
 - a. Use correct lifting techniques to lift the stretcher
 - b. Partners should have similar strength and height
 - 4. One-handed carrying technique
 - a. Pick up and carry with the back in the locked-in position
 - b. Avoid leaning to either side to compensate for the imbalance
 - 5. Correct carrying procedure on stairs
 - a. When possible, use a stair chair instead of a stretcher
 - b. Keep back in locked-in position
 - c. Flex at the hips, not the waist; bend at the knees
 - d. Keep weight and arms as close to the body as possible
- C. Reaching
- 1. Guidelines for reaching
 - a. Keep back in locked-in position
 - b. When reaching overhead, avoid hyperextended position
 - c. Avoid twisting the back while reaching
 - 2. Application of reaching techniques
 - a. Avoid reaching more than 15 - 20 inches in front of the body
 - b. Avoid situations where prolonged (more than a minute) strenuous effort is needed in order to avoid injury
 - 3. Correct reaching for log rolls
 - a. Keep back straight while leaning over patient
 - b. Lean from the hips
 - c. Use shoulder muscles to help with roll
- D. Pushing and pulling guidelines
- 1. Push, rather than pull, whenever possible

2. Keep back locked-in
 3. Keep line of pull through center of body by bending knees
 4. Keep weight close to the body
 5. Push from the area between the waist and shoulder
 6. If weight is below waist level, use kneeling position
 7. Avoid pushing or pulling from an overhead position if possible
 8. Keep elbows bent with arms close to the sides
- II. Principles of Moving Patients
- A. General considerations
1. In general, a patient should be moved immediately (emergency move) only when:
 - a. There is an immediate danger to the patient if not moved
 - (1) Fire or danger of fire
 - (2) Explosives or other hazardous materials
 - (3) Inability to protect the patient from other hazards at the scene
 - (4) Inability to gain access to other patients in a vehicle who need life-saving care
 - b. Life-saving care cannot be given because of the patient's location or position, e.g., a cardiac arrest patient sitting in a chair or lying on a bed
 2. A patient should be moved quickly (urgent move) when there is immediate threat to life
 - a. Altered mental status
 - b. Inadequate breathing
 - c. Shock
 3. If there is no threat to life, the patient should be moved when ready for transportation (non-urgent move)
- B. Emergency moves
1. The greatest danger in moving a patient quickly is the possibility of aggravating a spine injury
 2. In an emergency, every effort should be made to pull the patient in the direction of the long axis of the body to provide as much protection to the spine as possible
 3. It is impossible to remove a patient from a vehicle quickly and at the same time provide as much protection to the spine as can be accomplished with an interim immobilization device
 4. If the patient is on the floor or ground, he can be moved by:
 - a. Pulling on the patient's clothing in the neck and shoulder area
 - b. Putting the patient on a blanket and dragging the blanket
 - c. Putting the EMT's hands under the patient's armpits (from the back), grasping the patient's forearms and dragging the patient
- C. Urgent moves
1. Rapid extrication of patient sitting in vehicle

- a. One EMT gets behind patient and brings cervical spine into neutral in-line position and provides manual immobilization
 - b. A second EMT applies cervical immobilization device as the third EMT first places long backboard near the door and then moves to the passenger seat
 - c. The second EMT supports the thorax as the third EMT frees the patient's legs from the pedals
 - d. At the direction of the second EMT, he and the third EMT rotate the patient in several short, coordinated moves until the patient's back is in the open doorway and his feet are on the passenger seat
 - e. Since the first EMT usually cannot support the patient's head any longer, another available EMT or a bystander supports the patient's head as the first EMT gets out of the vehicle and takes support of the head outside of the vehicle
 - f. The end of the long backboard is placed on the seat next to the patient's buttocks. Assistants support the other end of the board as the first EMT and the second EMT lower the patient onto it
 - g. The second EMT and the third EMT slide the patient into the proper position on the board in short, coordinated moves
 - h. Several variations of the technique are possible, including assistance from bystanders. Must be accomplished without compromise to the spine.
- D. Non-urgent moves
1. Direct ground lift (no suspected spine injury)
 - a. Two or three rescuers line up on one side of the patient
 - b. Rescuers kneel on one knee (preferably the same for all rescuers)
 - c. The patient's arms are placed on his chest if possible
 - d. The rescuer at the head places one arm under the patient's neck and shoulder and cradles the patient's head. He places his other arm under the patient's lower back.
 - e. The second rescuer places one arm under the patient's knees and one arm above the buttocks
 - f. If a third rescuer is available, he should place both arms under the waist and the other two rescuers slide their arms either up to the mid-back or down to the buttocks as appropriate
 - g. On signal, the rescuers lift the patient to their knees and roll the patient in toward their chests
 - h. On signal, the rescuers stand and move the patient to the stretcher
 - i. To lower the patient, the steps are reversed
 2. Extremity lift (no suspected extremity injuries)

- a. One rescuer kneels at the patient's head and one kneels at the patient's side by his knees
 - b. The rescuer at the head places one hand under each of the patient's shoulders while the rescuer at the foot grasps the patient's wrists
 - c. The rescuer at the head slips his hands under the patient's arms and grasps the patient's wrists
 - d. The rescuer at the patient's foot slips his hands under the patient's knees
 - e. Both rescuers move up to a crouching position
 - f. The rescuers stand up simultaneously and move with the patient to a stretcher
3. Transfer of supine patient from bed to stretcher
 - a. Direct carry
 - (1) Position cot perpendicular to bed with head end of cot at foot of bed
 - (2) Prepare cot by unbuckling straps and removing other items
 - (3) Both rescuers stand between bed and stretcher, facing patient
 - (4) First rescuer slides arm under patient's neck and cups patient's shoulder
 - (5) Second rescuer slides hand under hip and lifts slightly
 - (6) First rescuer slides other arm under patient's back
 - (7) Second rescuer places arms underneath hips and calves
 - (8) Rescuers slide patient to edge of bed
 - (9) Patient is lifted/curled toward the rescuers' chests
 - (10) Rescuers rotate and place patient gently onto cot
 - b. Draw sheet method
 - (1) Loosen bottom sheet of bed
 - (2) Position cot next to bed
 - (3) Prepare cot: Adjust height, lower rails, unbuckle straps
 - (4) Reach across cot and grasp sheet firmly at patient's head, chest, hips and knees
 - (5) Slide patient gently onto cot

III. Equipment

A. Stretchers/cots

1. Types

a. Wheeled stretcher

- (1) Most commonly used device
- (2) Rolling
 - (a) Restricted to smooth terrain
 - (b) Foot end should be pulled
 - (c) One person must guide the stretcher at head

- (3) Carrying
 - (a) Two rescuers
 - i) Preferable in narrow spaces, but requires more strength
 - ii) Easily unbalanced
 - iii) Rescuers should face each other from opposite ends of stretcher
 - (b) Four rescuers
 - i) One rescuer at each corner
 - ii) More stability and requires less strength
 - iii) Safer over rough terrain
- (4) Loading into ambulance
 - (a) Use sufficient lifting power
 - (b) Load hanging stretchers before wheeled stretchers
 - (c) Follow manufacturer's directions
 - (d) Ensure all cots and patients secured before moving ambulance
- b. Portable stretcher
- c. Stair chair
- d. Backboards
 - (1) Long
 - (a) Traditional wooden device
 - (b) Manufactured varieties
 - (2) Short
 - (a) Traditional wooden device
 - (b) Vest type device
- e. Scoop or orthopedic stretcher
- f. Flexible stretcher
- g. Child passenger safety seats – for detailed information regarding the safe transport of children by EMS providers, reference guidelines created by Wisconsin EMS for Children (EMSC)
- h. **Bariatric stretcher**
- i. **Powered stretcher**
- j. **Neonate isolette**
- 2. Maintenance - follow manufacturer's directions for inspection, cleaning, repair and upkeep
- B. Patient positioning
 - 1. An unresponsive patient without suspected spine injury should be moved into the recovery position by rolling the patient onto his side (preferably the left) without twisting the body
 - 2. A patient with chest pain or discomfort or difficulty breathing should sit in a position of comfort as long as hypotension is not present
 - 3. A patient with suspected spine injury should be immobilized on a long backboard

4. A patient in shock (hypoperfusion) should potentially be positioned with lower extremities elevated (per local protocol)
5. A patient who is pregnant should be transported on her left side to prevent and minimize hypotension
6. A patient who is nauseated or vomiting should be transported in a position of comfort; however, the EMT should be positioned appropriately to manage the airway
7. Bariatric patients may need specialized lifting and transportation

MODULE 1

Preparatory

Lesson 1-7

Evaluation: Preparatory

OBJECTIVES

OBJECTIVES LEGEND

C=Cognitive P=Psychomotor A=Affective

1 = Knowledge level

2 = Application level

3 = Problem-solving level

COGNITIVE OBJECTIVES

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

Demonstrate knowledge of the cognitive objectives of Lesson 1-1: Introduction to Emergency Care.

Demonstrate knowledge of the cognitive objectives of Lesson 1-2: Workforce Safety and Wellness.

Demonstrate knowledge of the cognitive objectives of Lesson 1-3: Medical/Legal and Ethical Issues.

Demonstrate knowledge of the cognitive objectives of Lesson 1-4: Overview of the Human Body and Physiology.

Demonstrate knowledge of the cognitive objectives of Lesson 1-5: Pathophysiology.

Demonstrate knowledge of the cognitive objectives of Lesson 1-6: Lifting and Moving Patients.

AFFECTIVE OBJECTIVES

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

Demonstrate knowledge of the affective objectives of Lesson 1-1: Introduction to Emergency Care.

Demonstrate knowledge of the affective objectives of Lesson 1-2: Well-Being of the EMT.

Demonstrate knowledge of the affective objectives of Lesson 1-3: Medical/Legal and Ethical Issues.

PSYCHOMOTOR OBJECTIVES

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

Demonstrate proficiency in the psychomotor objectives of Lesson 1-2: Well-Being of the EMT.

Demonstrate proficiency in the psychomotor objectives of Lesson 1-5: Lifting and Moving Patients.

MODULE 2

Patient Assessment

Lesson 2-1

Scene Size-up

OBJECTIVES

OBJECTIVES LEGEND

C=Cognitive P=Psychomotor A=Affective

1 = Knowledge level

2 = Application level

3 = Problem-solving level

COGNITIVE OBJECTIVES

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

- 2-1.1 Recognize potential scene hazards. (C-1)
- 2-1.2 Describe common hazards found at the scene of a trauma and a medical patient. (C-1)
- 2-1.3 Determine if the scene is safe to enter. (C-2)
- 2-1.4 Define the concept of standard precautions and the need for personal protective equipment. (C-2)
- 2-1.5 Discuss common mechanisms of injury/nature of illness. (C-1)
- 2-1.6 Describe methods to manage hazards at the scene. (C-3)
- 2-1.7 Discuss the reason for identifying the total number of patients at the scene. (C-1)
- 2-1.8 Discuss the rationale for considering the possible need for early c-spine precautions in the patient assessment process. (C-1)
- 2-1.9 Explain the reason for identifying the need for additional help or assistance. (C-1)

AFFECTIVE OBJECTIVES

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

- 2-1.10 Explain the rationale for crew members to evaluate scene safety prior to entering. (A-2)
- 2-1.11 Serve as a model for others explaining how patient situations affect your evaluation of mechanism of injury or nature of illness. (A-2)

PSYCHOMOTOR OBJECTIVES

No psychomotor objective identified.

PRESENTATION

Declarative (What)

- I. Scene Size-up (READ the scene) – gather, evaluate and synthesize information from dispatch, the scene and the patient
 - A. Overview of Standard Precautions

1. All blood, body fluids, secretions, excretions (except sweat) non-intact skin, and mucous membranes may contain transmissible infectious agents.
 2. Review prevention practices that apply to all patients.
 3. Universal precautions developed to protect healthcare personnel
 4. Standard precautions focus on protection of patients.
 5. Body substance isolation review
 - a. Eye protection if necessary
 - b. Gloves if necessary
 - c. Gown if necessary
 - d. Mask if necessary
 - e. Hand washing
 6. Personal protective equipment
 - a. Clothing or specialized equipment that provides some protection to the wearer from substances that may pose a health or safety risk.
 - b. Used by those specially trained
 - c. Utilize appropriate for the potential hazard
 - (1) steel-toe boots
 - (2) helmets
 - (3) heat-resistant outerwear
 - (4) self-contained breathing apparatus
 - (5) leather gloves
- B. Scene safety
1. Definition - an assessment of the surroundings (weather, environmental factors and clues from the scene) to assure the well-being of the EMT
 2. Personal protection - Is it safe to approach the patient?
 - a. Crash/rescue scenes
 - b. Toxins and gases
 - c. Chemical and biological hazards
 - d. Crime scenes - potential for violence
 - e. Unstable surfaces: slope, ice, water
 3. Protection of the patient - environmental considerations
 4. Protection of bystanders - if appropriate, help the bystander avoid becoming a patient
 5. If the scene is unsafe, make it safe. Otherwise, do not enter.
- C. Think under pressure
1. Stop and think
 2. Scan the situation
 3. Decide and act
 4. Maintain control
 5. Continually reevaluate
- D. Mechanism of injury/ nature of illness
1. Medical

- a. Nature of illness (NOI) – attempt to determine by interviewing the patient, family or bystanders
 - b. Determine the total number of patients. If there are more patients than the responding unit can efficiently handle, initiate a mass casualty plan.
 - (1) Obtain additional help prior to contact with patients: law enforcement, fire, rescue, ALS, utilities. EMT is less likely to call for help when involved in patient care.
 - (2) Begin triage
2. Trauma
- a. Mechanism of injury (MOI) – attempt to determine the specific cause of injury by interviewing the patient, family or bystanders, as well as inspect the scene for clues
 - b. Consider the need for c-spine protection early in the assessment process
 - c. Determine the total number of patients
 - (1) If there are more patients than the responding unit can effectively handle, initiate a mass casualty plan.
 - (a) Obtain additional help prior to contact with patients. EMT is less likely to call for help when involved in patient care.
 - (b) Begin triage
 - (2) If the responding crew can manage the situation, consider spinal precautions and continue care.
 - d. Consider use of incident/management command system (ICS or IMS) (Refer to EMS Operations Module.)

MODULE 2

Patient Assessment

Lesson 2-2

Primary Assessment

OBJECTIVES

OBJECTIVES LEGEND

C=Cognitive P=Psychomotor A=Affective

1 = Knowledge level

2 = Application level

3 = Problem-solving level

COGNITIVE OBJECTIVES

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

- 2-2.1 Summarize the reasons for forming a general impression of the patient. (C-1)
- 2-2.2 Discuss methods of assessing mental status. (C-1)
- 2-2.3 State reasons for management of the cervical spine based on MOI. (C-1)
- 2-2.4 Discuss methods of assessing the patient's airway. (C-1)
- 2-2.5 Discuss the care that should be provided to correct airway problems. (C-1)
- 2-2.6 Describe methods used for assessing breathing status. (C-1)
- 2-2.7 Differentiate signs and symptoms of adequate and inadequate breathing (C-1)
- 2-2.8 State the care that should be provided to the patient based on assessment findings of breathing. (C-1)
- 2-2.9 Describe the methods used to obtain a pulse in an adult and pediatric patient. (C-1)
- 2-2.10 State the care that should be provided based on the assessment findings during the pulse check. (C-1)
- 2-2.11 Discuss the need for assessing the patient for external bleeding. (C-1)
- 2-2.12 Describe normal and abnormal findings when assessing skin color, temperature and condition. (C-1)
- 2-2.13 Describe normal and abnormal findings when assessing skin capillary refill time (CRT) (C-1)
- 2-2.14 Consider the need to perform a rapid physical scan based on patient's MOI. (C-3)
- 2-2.15 Explain the reason for prioritizing a patient for care and transport. (C-1)

AFFECTIVE OBJECTIVES

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

- 2-2.16 Explain the importance of forming a general impression of the patient. (A-1)
- 2-2.17 Explain the value of performing a primary assessment. A-1)

PSYCHOMOTOR OBJECTIVES

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

- 2-2.18 Demonstrate the techniques for assessing mental status. (P-1, 2)
- 2-2.19 Demonstrate the techniques for assessing the airway. (P-1, 2)

- 2-2.20 Demonstrate the techniques for assessing the respiratory status of the patient. (P-1, 2)
- 2-2.21 Demonstrate the techniques for assessing if the patient has a pulse. (P-1, 2)
- 2-2.22 Demonstrate the techniques for assessing the patient for external bleeding. (P-1, 2)
- 2-2.23 Demonstrate the techniques for assessing the patient's skin color, temperature, condition and capillary refill (P-1, 2)
- 2-2.24 Demonstrate the ability to prioritize patients. (P-1, 2)

PRESENTATION

Declarative (What)

- I. General Impression (READ the patient) – gather, evaluate and synthesize information about the patient
 - A. **Components**
 - 1. The general impression is formed to determine priority of care and is based upon the EMT's assessment of the environment.
 - 2. Approximate age
 - 3. Gender
 - 4. Race
 - 5. Note position and location of patient
 - 6. **Does patient appear stable or unstable?**
 - B. Assess patient and determine if the patient has a life threatening condition. Observe, talk, touch and listen to the patient.
 - 1. If a life threatening condition is found, treat immediately.
 - 2. Assess nature of illness or mechanism of injury.
- II. Assess Patient's Mental Status. Maintain spinal immobilization if needed.
 - A. Begin by speaking to the patient. State name, tell the patient that you are an EMT, and explain that you are here to help.
 - 1. **Patient may respond with chief complaint at this time.**
 - B. Levels of consciousness (mental status) – AVPU Scale
 - 1. Alert
 - a. **The patient appears to be awake**
 - b. **The patient acknowledges the presence of the EMT**
 - 2. Responds to Verbal stimuli.
 - a. **The patient opens his/her eyes in response to the EMT's voice**
 - b. **The patient responds appropriately to a simple command**
 - c. **EMT should speak slowly and clearly**
 - 3. Responds to Painful stimuli.
 - a. **The patient neither acknowledges the presence of the EMT nor responds to loud voice**
 - b. **Patient responds only when the EMT applies some form of irritating stimulus**

- (1) When an irritating stimulus is encountered, the human body will either attempt to move away from the stimulus or will attempt to move the stimulus away from the body
 - (2) Acceptable stimuli
 - (a) Pinch the patient's ear
 - (b) Trapezius squeeze
 - (c) Flicking bottom of infant's feet
 4. Unresponsive - no gag or cough reflex
 - a. The patient does not respond to any stimulus
 - C. Patient affect – how patient is dealing with the situation and surroundings.
- III. Assess the Patient's Airway and REACT by managing life-threats.
- A. Responsive patient - Is the patient talking or crying?
 1. If yes, assess for adequacy of breathing.
 - a. Airway may still be at risk
 - b. Monitor for fluids or foreign bodies in the mouth
 - (1) Suction
 - (2) Finger sweep per American Heart Association (AHA) guidelines
 - c. Narrowed upper airway may produce stridor
 2. If no, open airway and provide additional airway care/rescue breathing as needed.
 3. Continually reassess airway patency.
 - B. Unresponsive patient - Is the airway open?
 1. Open the airway. Positioning is patient, age, and size specific.
 - a. For medical patients, perform the head-tilt chin-lift.
 - (1) Clear
 - (2) Not clear - Clear the airway.
 - b. For trauma patients or those with unknown nature of illness, the cervical spine should be stabilized/immobilized and the jaw thrust maneuver performed.
 - (1) Clear
 - (2) Not clear - Clear the airway.
 - c. Continually reassess airway patency.
- IV. Assess the patient's breathing and REACT by managing life-threats.
 - A. If breathing is adequate and the patient is responsive, oxygen may be indicated.
 - B. All responsive patients breathing greater than 24 breaths per minute (**too fast**) or less than 8 breaths per minute (**too slow**) should receive high flow oxygen and ventilatory assistance if tidal volume is inadequate.
 - C. If the patient is unresponsive and the breathing is adequate, open and maintain the airway and provide high flow oxygen.
 - D. If the breathing is inadequate, open and maintain the airway, assist the patient's breathing and utilize airway adjuncts. In all cases oxygen should be used.

- E. If the patient is not breathing, open and maintain the airway and ventilate using airway adjuncts. In all cases oxygen should be used.
- F. **It may be necessary to obtain the respiratory rate at this time.**
- V. Assess the patient's circulation and REACT by managing life-threats.
 - A. Assess the patient's pulse.
 - 1. **It may be necessary to obtain the pulse rate at this time.**
 - 2. **Consider whether pulse is normal, fast, slow, irregular, absent.**
 - 3. **Pulse locations based upon patient age and LOC**
 - a. **Patient one year old or less, palpate a brachial pulse.**
 - b. **Patient conscious, over 1 year old, palpate radial pulse.**
 - c. **If radial pulse is absent, or patient unconscious, palpate carotid**
 - d. **If pulseless, follow current AHA guidelines¹**
 - B. Assess if major bleeding is present. If bleeding is present, control bleeding.
 - C. Assess the patient's perfusion by evaluating skin color and temperature.
 - 1. The patient's skin color is assessed by looking at the nail beds, lips and eyes.
 - a. Normal - pink
 - b. Abnormal conditions
 - (1) Pale
 - (2) Cyanotic or blue-gray
 - (3) Flushed or red
 - (4) Jaundice or yellow
 - 2. Assess the patient's skin temperature by feeling the skin.
 - a. Normal - warm
 - b. Abnormal skin temperatures
 - (1) Hot
 - (2) Cool
 - (3) Cold
 - (4) Clammy - cool & moist
 - 3. Assess the patient's skin condition. This is an assessment of the amount of moisture on the skin.
 - a. Normal - dry
 - b. Abnormal - moist or wet
 - 4. Assess capillary refill **time (CRT) as appropriate**
 - a. Normal capillary refill is less than two seconds.
 - b. **More reliable indicator in children younger than 6 yo**
 - c. **Exposure to cold, peripheral disease, older patient may alter CRT**
- VI. Establish a differential diagnosis/field impression – determine the most likely cause of the MOI/NOI that fits the patient's initial presentation of signs and symptoms.
- VII. Expose patient as needed.
- VIII. **Consider performing a rapid physical exam (rapid scan) as dictated by patient's MOI (60-90 second head-to-toe) Note: refer to secondary assessment**

- IX. Determine whether patient has a life-threatening condition
- X. Integrate treatment/procedures needed to preserve life
- XI. Evaluate priority of patient care and make a transport decision – determine the most serious condition or cause that fits the patient’s initial presentation of signs and symptoms.
 - A. Consider:
 - 1. Poor general impression
 - 2. Unresponsive patients - no gag or cough
 - 3. Responsive, not following commands
 - 4. Difficulty breathing
 - 5. Shock
 - 6. Complicated childbirth
 - 7. Chest pain with BP <100 systolic
 - 8. Uncontrolled bleeding
 - 9. Severe pain anywhere
 - B. Evaluate whether patient is stable, potentially unstable or unstable
 - C. Expedite transport of the patient. Consider ALS back up.
- XII. Proceed to appropriate history-taking and secondary assessment.

MODULE 2

Patient Assessment

Lesson 2-3

History-Taking

Vital Signs

Monitoring Devices

OBJECTIVES

OBJECTIVES LEGEND

C=Cognitive P=Psychomotor A=Affective

1 = Knowledge level

2 = Application level

3 = Problem-solving level

COGNITIVE OBJECTIVES

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

- 2-3.1 Define “patient’s chief complaint”. (C-1)
- 2-3.2 State methods used to investigate the patient’s chief complaint including the use of family, bystanders, medical alert jewelry. (C-1)
- 2-3.3 List the components of a patient history, including statistical and demographic, pertinent past medical history and current health status (C-1)
- 2-3.4 Describe the techniques of history taking and the importance of setting the stage in learning about the present illness. (C-1)
- 2-3.5 Demonstrate questioning techniques used to determine the patient’s chief complaint. (C-2)
- 2-3.6 Identify the components of the SAMPLE history. (C-1)
- 2-3.7 Give examples of questions utilized when obtaining SAMPLE history (C-2)
- 2-3.8 Identify the components of the OPQRST history. (C-1)
- 2-3.9 Give examples of questions utilized when obtaining the OPQRST history. (C-3)
- 2-3.10 Recognize the importance of using a standardized approach to history-taking. (C-1)
- 2-3.11 List sensitive topics which may produce discomfort during patient questioning. (C-1)
- 2-3.12 Describe situations which provide communication challenges during history-taking. (C-2)
- 2-3.13 Identify the components of vital signs (C-1)
- 2-3.14 Describe the methods used to assess the patient’s respiratory status.
- 2-3.15 Differentiate between normal and abnormal respiratory effort. (C-3)
- 2-2.16 Describe the methods used to obtain a pulse in adult and pediatric patients. (C-1)
- 2-2.17 Differentiate between normal and abnormal pulses. (C-3)
- 2-2.18 Describe the method used to assess the patient’s skin. (C-1)
- 2-2.19 Differentiate between normal and abnormal findings when assessing skin color, temperature and condition. (C-1)
- 2-2.20 Describe normal and abnormal findings when assessing skin capillary refill. (C-1)
- 2-3.21 Describe the methods to assess the pupils. (C-1)
- 2-3.22 Differentiate between normal and abnormal pupil size and reactivity. (C-3)

- 2-3.23 Describe the methods to assess blood pressure (manual and automated). (C-1)
- 2-3.24 Define systolic pressure. (C-1)
- 2-3.25 Define diastolic pressure. (C-1)
- 2-3.26 Explain the difference between auscultation and palpation for obtaining a blood pressure. (C-1)
- 2-3.27 Describe the basic concept of pulse oximetry monitoring. (C-1)
- 2-3.28 Troubleshoot errors that can occur when using a pulse oximeter. (C-3)

AFFECTIVE OBJECTIVES

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

- 2-3.29 Recognize and respond to the feelings patients experience during assessment. (A-1)
- 2-3.30 Explain the importance of obtaining a SAMPLE history. (A-1)
- 2-3.31 Explain the importance of obtaining an OPQRST history. (A-1)
- 2-3.32 Explain the value of performing the baseline vital signs. (A-2)
- 2-3.33 Defend the need for obtaining, recording and reassessing accurate vital signs for the patient. (A-1)
- 2-3.34 Describe the basic concept of pulse oximetry monitoring. (C-1)
- 2-3.35 Troubleshoot errors that can occur when using a pulse oximeter. (C-3)

PSYCHOMOTOR OBJECTIVES

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

- 2-3.36 Demonstrate the skills that should be used to obtain information from the patient, family, or bystanders at the scene. (P-1, 2)
- 2-3.37 Demonstrate the skills involved in assessment of breathing. (P-1, 2)
- 2-3.38 Demonstrate the skills associated with obtaining a pulse. (P-1, 2)
- 2-3.39 Demonstrate the skills associated with assessing the skin color, temperature, condition, and capillary. (P-1, 2)
- 2-3.40 Demonstrate the skills associated with assessing the pupils. (P-1,2)
- 2-3.41 Demonstrate the skills associated with obtaining blood pressure. (P-1,2)
- 2-3.42 Demonstrate proper placement of the transducer utilized in pulse oximetry. (P-2)
- 2-3.43 Demonstrate how to obtain a reading of the percentage of oxygen saturation. (P-2)

PRESENTATION

Declarative (What)

NOTE: History-taking is an interview process that begins with initial contact of the patient and continues throughout assessment and care. The order in which history-taking components are utilized is dependent upon individual patient presentation. The first set of vital signs will establish a “baseline” from which to compare additional sets of vital signs and to note the “trending” of the patient. These will also assist in identifying the majority of life-threatening conditions and

are influenced by the patient's age and underlying medical and physical conditions. They provide benefit as a triage tool to estimate severity of the patient's condition. Monitoring devices assist the EMS provider in obtaining additional information about the patient's condition and help to lead into treatment modalities. As with the history-taking, the condition of the patient will make a determination regarding the order in which history-taking, vital signs, or monitoring devices will be utilized.

I. History-Taking

- A. Investigation of the chief complaint
 - 1. The chief complaint is a very brief description of the reason for summoning EMS to the scene.
 - 2. Factors influencing the data collection
 - a. What is the source of the information
 - (1) Patient (usually the best source for information)
 - (2) Family
 - (3) Friends
 - (4) Bystanders
 - (5) Public safety personnel
 - (6) Medical identification jewelry or other medical information sources
 - b. How reliable is the data?
 - 3. History of the present illness
 - a. Detailed evaluation of the chief complaint
 - b. Provides a full, clear, chronological account of the signs and symptoms
- B. Components of a patient history
 - 1. Statistical and demographic
 - a. Obtain correct dates
 - b. Accurately document all times
 - c. Identifying data
 - (1) Age
 - (2) Sex
 - (3) Race
 - 2. Past medical history (pertinent to the medical event)
 - a. Medical
 - b. Trauma
 - c. Surgical
 - d. Consider medical identification tag
 - 3. Current health status (pertinent to the medical event)
 - a. Focuses on present state of health
 - b. Environmental conditions
 - c. Individual Factors
 - (1) Current medications
 - (2) Allergies
 - (3) Tobacco use

- (4) Alcohol, drugs and related substances
 - (5) Diet
 - (6) Screening tests
 - (7) Immunizations
 - (8) Environmental hazards
 - (9) Use of safety measures (in and out of the home)
 - (10) Family history
- C. Techniques of history taking
- 1. Setting the stage
 - a. Environment-personal space
 - b. EMS personnel demeanor and appearance
 - (1) Be aware of body language
 - (2) Clean, neat and professional
 - c. Note-taking
 - (1) Difficult to remember all details
 - (2) Most patients comfortable with note-taking
 - 2. Learning about the present illness
 - a. Refer to the patient by their last name with the proper title-Mr.,Mrs.,Ms-unless they inform you otherwise.
 - b. Avoid the use of unfamiliar or demeaning terms such as “granny” or “honey”
 - 3. Determine chief complaint
 - a. Use a general, open-ended question
 - b. Follow the patient’s lead
 - (1) Facilitation-posture should encourage the patient;
 - (a) Make eye contact; saying “go on” or “I’m listening” may help the patient to continue
 - (2) Clarification-used to clarify ambiguous statements/words
 - (3) Empathetic responses-use techniques of therapeutic communication to interpret feelings and your response
 - (4) Confrontation-some issues or responses may require you to confront patients about their feelings
 - (5) Interpretation-goes beyond confrontation, requires you to make an inference
 - 4. History of the present illness
 - a. Location (where is it?)
 - b. Onset (acute versus gradual occurrence of symptoms?)
 - c. Provocative, palliative and positioning
 - (1) What makes it worse?
 - (2) What makes it better?
 - (3) What position is comfortable for the patient?
 - d. Quality (what is it like?)
 - e. Radiation (does it move anywhere?)
 - f. Severity-quantify pain, utilize the scale, 0-10

- g. Time- duration-when did it start, how long does it last?
 - h. Associated signs and symptoms
 - i. Pertinent negative(s)
 - j. For trauma patients, determine the mechanism of injury
 - 5. Assess past medical history (pertinent to the medical event)
 - a. Pre-existing medical conditions or surgeries
 - b. Medications
 - c. Allergies
 - d. Family history
 - e. Social history; travel history
 - 6. Current health status
 - a. Tobacco use
 - b. Use of alcohol, drugs and other related substances
 - c. Diet
- D. Standardized approach to history-taking
 - 1. SAMPLE
 - a. S=signs (any condition heard, seen, felt by the EMT) and symptoms (any condition described by the patient)
 - b. A=allergies
 - (1) Medication
 - (2) Environmental
 - c. M=medications
 - (1) Over the counter (OTC)
 - (2) Prescribed
 - (3) Vitamins and herbal
 - (4) Birth control/erectile dysfunction
 - (5) Other people's medications
 - (6) Recreational drugs
 - d. P=past pertinent medical history
 - (1) Medical
 - (2) Surgical
 - (3) Trauma
 - (4) Consider medical identification tag
 - e. L=last oral intake
 - (1) Fluids
 - (2) Food and other substances
 - (3) Time and quantity
 - f. E=events leading to the illness or injury-what was taking place just prior to illness or injury?
 - 2. OPQRST history
 - a. O=onset-occurrence of signs or symptoms
 - b. P=provocative, palliative (comfort given) and positioning
 - c. Q=quality of the discomfort-burning, stabbing, crushing
 - d. R=radiation
 - e. S=severity-pain scale, 0-10

- f. T=time- relating to onset, however, more definitive in regard to initial onset in the history and intermittent pain
- E. Taking history on sensitive topics
 - 1. Alcohol and drugs
 - 2. Physical abuse or violence
 - 3. Sexual history
 - 4. Special challenges
 - a. Silent patient
 - (1) Silence is often uncomfortable
 - (2) Be alert for nonverbal clues or distress
 - (3) Silence may be the result of the interviewer's lack of sensitivity
 - b. Overly talkative patients
 - (1) Give the patient free reign for the first several minutes.
 - (2) Summarize frequently
 - c. Patient with multiple symptoms
 - d. Anxious patient
 - (1) Anxiety is natural
 - (2) Be sensitive to nonverbal clues
 - (3) Reassurance
 - e. Angry and hostile patient
 - (1) Understand that anger and hostility maybe natural
 - (2) Often the anger is displaced toward the clinician
 - (3) Do not get angry in return
 - f. Intoxicated patient
 - (1) Be accepting, not challenging
 - (2) Do not attempt to have the patient lower their voice or stop cursing; this may aggravate them
 - (3) Avoid trapping them in small areas
 - (4) Treat with dignity, despite their intoxication
 - g. Crying patient may provide valuable insight
 - h. Depressed patient
 - (1) Be alert for signs of depression
 - (2) Be willing to listen and be non-judgmental
 - i. Patient with confusing behavior or history
 - j. Patient with limited cognitive abilities
 - (1) Do not overlook the ability of these patients to provide you with adequate information
 - (2) Be alert for omissions
 - k. EMT-patient language barrier-take every possible step to find a translator.
 - l. Patient with hearing problem-if the patient can write, have him/her write down questions and answers on paper
 - m. Patient with visual impairment-be careful to announce presence and provide careful explanations

- n. Talking with family and friends
 - (1) Some patients may not be able to provide you with all information
 - (2) Try to find a third party who can help you get the whole story
- F. Variations may be necessary for history-taking with the pediatric patient, geriatric patient and the patient with special challenges, assessment and management. (Refer to module on Special Patient Populations)
 - 1. Pediatric
 - 2. Geriatric
 - a. Obtain eye glasses and hearing aids
 - b. Expect history to take more time
- II. Baseline Vital Signs
 - A. Breathing - assessed by observing the patient's chest rise and fall
 - 1. Expose chest, as necessary; note chest shape and symmetry
 - 2. Rate-count the number of breaths in a 30-second interval and multiply by 2. To avoid influencing rate, do not let patient know this process is taking place.
 - 3. Quality-note effort of breathing: normal - average chest rise and fall; shallow - slight chest or abdominal wall motion; labored-accessory muscle use, grunting, increased effort, gasping, nasal flaring and supraclavicular and intercostal retractions in pediatric patient.
 - 4. Sounds during auscultation – presence/absence, stridor, snoring, wheezing, gurgling, crowing
 - B. Pulse-assessed by palpating artery
 - 1. Location-initially radial if older than 1 year; younger than 1 year utilize brachial.
 - 2. Note rate by counting number of beats in a 30-second interval and multiply by 2
 - 3. Note quality (strength) and rhythm of pulse-strong, weak, strong, regular, irregular
 - 4. If peripheral pulse is absent, assess carotid pulse one side at a time, avoiding excessive pressure on geriatrics.
 - C. Skin
 - 1. Color should be assessed in nail beds, oral mucosa, conjunctiva and hands and soles of feet in pediatric patients.
 - 2. Normal is pink; abnormal is pale (poor perfusion/impaired blood flow), cyanotic (blue-gray indicating inadequate oxygenation or poor perfusion), flushed (red indicating exposure to heat or carbon monoxide poisoning), jaundice (yellow indicating liver abnormalities)
 - 3. Temperature is assessed by placing back of hand on patient's skin-normal is warm; abnormal includes hot (indicating fever or heat exposure), cool (indicating poor perfusion or exposure to cold), cold (indicating extreme exposure to cold or death)
 - 4. Condition-normal is dry; abnormal is wet, moist, or dry

5. Capillary refill-should be less than 2 seconds; more reliable perfusion indicator in the pediatric patient than the adult; affected by age, temperature, disease
- D. Pupils
1. Assessed by briefly shining a light into the patient's eyes and determining size and reactivity
 2. Dilated (very big), normal, or constricted (small)
 3. Equal or unequal
 4. Reactivity is pupillary response to the light: reactive (change when exposed to light; non-reactive (no change when exposed to light);
 5. Normal reaction is both pupils constricting to light at the same time.
- E. Blood pressure
1. Assess systolic and diastolic pressures
 - a. Systolic blood pressure is the first distinct sound of blood flowing through the artery as the pressure in the blood pressure cuff is released. This is a measurement of the pressure exerted against the walls of the arteries during contraction of the heart.
 - b. Diastolic blood pressure is the point during deflation of the blood pressure cuff at which sounds of the pulse beat disappear. It represents the pressure exerted against the walls of the arteries while the left ventricle is at rest.
 - c. There are three methods of obtaining blood pressure
 - (1) Auscultation- EMT will listen for the systolic and diastolic sounds
 - (2) Palpation- the systolic blood pressure may be measured by feeling for return of pulse with deflation of the cuff
 - (3) Automated- use of a mechanical unit to obtain systolic and diastolic readings
 2. Measured in all patients older than 3 years of age
 3. The appearance of the infant or child patient is more valuable than blood pressure numbers
- F. REEVALUATE and document vital signs -
1. Every 15 minutes in a stable patient
 2. Every 5 minutes in the unstable patient
 3. Following all medical interventions
 4. Anytime patient status changes
- III. Pulse Oximetry
- A. Objectively determines the oxygenation status of a patient when applied correctly
 - B. Measures the percentage of circulating hemoglobin saturated with oxygen
 - C. Provide aggressive oxygenation to patients whose saturation level is less than 90%
 1. Normal pulse oximetry reading is greater than 95%

2. For some chronically ill patients (i.e. COPD) the normal may be 90-95%
- D. Monitor patient status at all times. DO NOT rely solely upon mechanical readings.
- E. Possible invalid readings
 1. Patient with low blood flow states (i.e., shock states, **hypothermia**, hypovolemia) may show an inaccurate low oxygenation saturation
 2. Patient who has experienced carbon monoxide poisoning may show a false high percent reading. In this case, the oximeter is picking up the carbon monoxide that is attached to the hemoglobin and inaccurately assuming it to be oxygen.
 3. Patients with certain anemias and oxygen capacity carrying diseases (i.e., sickle cell) may also show a false high reading. The monitor is measuring that each hemoglobin molecule is saturated but is not able to accurately note that the hemoglobin count itself is diminished.
 4. Patients with fingernail polish, excessive grease and dirt, nail-tips, or gel nails may also present with a false low reading. The infrared and red light is not able to penetrate the polish, dirt or nail endings.
 5. Jaundice, patient movement and bright light may interfere with accurate pulse oximeter readings
 6. If the pulse rate on the monitor is incorrect, the validity of the pulse oximeter reading must be questioned
- F. Placement of the transducer
 1. Most commonly accepted placement is the distal end of a finger or toe. Remove excessive dirt, grease or nail polish prior to placement.
 2. Pediatric pulse oximetry transducers tape around the great toe or around the foot
 3. The ear lobe is also an acceptable area
 4. The pediatric transducer may also be taped across the bridge of the nose of an adult patient. This is especially useful in patients with bad circulation to distal extremities.
- G. Obtaining a reading
 1. Once the transducer is placed and the monitor turned on, the monitor senses a pulse reading. Once the monitor senses the pulse, the oxygen saturation will be expressed in a percent fashion.
 2. The patient must have a palpable pulse before using the monitor
- H. Troubleshooting for simple errors
 1. Not detecting a pulse
 2. Patient does not have a pulse
 3. Transducer not applied to the patient or does not fit properly
 4. Transducer not able to read through nail polish, etc.
 5. Patient cable not connected to monitor
 6. Monitor not turned on
 7. Low battery

- I. Continuous alarm sounds
 - 1. Alarm limits set too low
 - 2. Alarm limits set too high
- IV. Other monitoring devices
 - A. Glucometer-refer to manufacturer's directions. This device to be discussed during endocrine disorders lesson
 - B. Automatic blood pressure measuring devices-refer to manufacturer's directions
 - C. Standard of Care and Scope of Practice is revised as other devices become recognized as acceptable use by the EMT

MODULE 2

Patient Assessment

Lesson 2-4

Secondary Assessment

OBJECTIVES

OBJECTIVES LEGEND

C=Cognitive P=Psychomotor A=Affective

1 = Knowledge level

2 = Application level

3 = Problem-solving level

COGNITIVE OBJECTIVES

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

- 2-4.1 Discuss the reasons to reconsider the mechanism of injury. (C-3)
- 2-4.2 Identify patients with a significant mechanism of injury. (C-1)
- 2-4.3 Differentiate between a rapid physical scan and a full-body secondary assessment. (C-1)
- 2-4.4 Recite examples and explain why patients should receive a rapid physical scan vs. a full-body secondary assessment. (C-1)
- 2-4.5 Describe the areas included in the rapid physical scan and discuss what should be evaluated. (C-3)
- 2-4.6 Differentiate when the rapid assessment may be altered in order to provide patient care. (C-3)
- 2-4.7 Discuss the reasons for performing a focused physical exam. (C-3)
- 2-4.8 Identify the anatomical regions and systems to be assessed. (C-3)
- 2-4.9 List the items that should be assessed in each area of the patient's body. (C-1)

AFFECTIVE OBJECTIVES

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

- 2-4.10 Recognize and respect the feelings that patients might experience during assessment. (A-1)

PSYCHOMOTOR OBJECTIVES

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

- 2-4.11 Demonstrate the rapid body scan, focused physical exam and secondary assessment that should be used to assess a patient based on mechanism of injury or nature of illness. (P-1,2)

PRESENTATION

Declarative (What)

- I. REEVALUATE mechanism of injury – continual gathering, evaluating and synthesizing information to determine significant MOI
 - A. Significant mechanism of injury
 - 1. Ejection from vehicle

2. Death in same passenger compartment
 3. Falls greater than 20 feet for adults (2010 Wisconsin Trauma Field Triage protocol) or per local protocol
 4. Roll-over of vehicle
 5. High-speed vehicle collision
 6. Vehicle-pedestrian collision
 7. Motorcycle crash
 8. Unresponsive or altered mental status
 9. Penetrations of the head, chest, or abdomen
 10. Hidden injuries
 - a. Seat belts
 - (1) If buckled, may have produced injuries
 - (2) If patient had seat belt on, it does not mean they do not have injuries
 - b. Airbags
 - (1) May not be effective without seat belt
 - (2) Patient can hit wheel after deflation
 - (3) Lift the deployed airbag and look at the steering wheel for deformation
 - (a) "Lift and look" under the bag after the patient has been removed
 - (b) Any visible deformation of the steering wheel should be regarded as an indicator of potentially serious internal injury, and appropriate action should be taken
- B. Infant and child considerations
1. Falls greater than 10 feet or 2-3 times the height (2010 Wisconsin Trauma Field Triage protocol) or per local protocol
 2. Bicycle collision
 3. Vehicle in medium speed collision
- II. Techniques of physical examination-general approach used to determine life threatening injuries. In the responsive patient, symptoms should be sought before and during the assessment process.
- A. Continue spinal stabilization, if utilized for patient based on MOI
 - B. Consider ALS request
 - C. Reconsider transport decision, revise if needed
 - D. Examine patient systematically; special emphasis should be placed on areas of chief complaint
 - E. Assessment procedure will be dependent upon MOI (significant and insignificant) and NOI (responsive and unresponsive patient)
 - F. Rapid physical (full-body) scan
 1. Typically done for patients with significant MOI and unresponsive patients with a NOI
 2. 60-90 seconds
 3. Done to quickly determine life-threatening problems
 4. Not always as organized as the secondary exam.

- G. **Focused assessment**
 - 1. Used generally for insignificant MOI and responsive medical patients
 - 2. Physical assessment is performed in the area of chief complaint of medical problem or injury site
 - 3. These patients generally not candidates for a full head-to-toe
- H. **Secondary head-to-toe assessment**
 - 1. Slower, more deliberate
 - 2. Performed at scene, in back of ambulance en route or not at all if patient care prohibits
- I. The assessment for all patients should include:
 - 1. Assessment of baseline vital signs
 - 2. Assess SAMPLE history
 - 3. Assess OPQRST, as appropriate
- J. Consider patient's apprehension during this process
- K. Maintain professionalism while displaying compassion toward patient
- L. As you inspect and palpate, look and feel for the following obvious signs of trauma using DCAPBTLS:
 - 1. Deformities
 - 2. Contusions
 - 3. Abrasions
 - 4. Punctures/penetrations
 - 5. Burns
 - 6. Tenderness
 - 7. Lacerations
 - 8. Swelling
- III. **Systems and anatomical regions to consider during assessment**
 - A. **Continue the assessment of the neurological system**
 - 1. **Mental status**
 - a. Level of consciousness-AVPU
 - b. Posture and motor behavior
 - c. Facial expression
 - (1) Anxiety
 - (2) Fear
 - (3) Sadness
 - (4) pain
 - 2. **Speech and language**
 - a. Rate
 - b. Appropriateness
 - (1) Slurred
 - (2) Garbled
 - (3) Aphasia
 - 3. **Mood**
 - a. Nature
 - b. Intensity
 - c. Suicidal ideation

4. **Thought and perception**
 - a. **Assess thought processes**
 - (1) **Logic**
 - (2) **Organization**
 - b. **Assess thought content**
 - (1) **Unusual thoughts**
 - (2) **Unpleasant thoughts**
 - c. **Assess perceptions**
 - (1) **Unusual**
 - (2) **Hearing things**
 - (3) **Seeing things**
 - d. **Memory and attention**
 - (1) **Person**
 - (2) **Place**
 - (3) **Time**
 - (4) **Purpose (event)**
- B. Assess the head, inspect and palpate to determine presence of injury/illness
 1. Scalp
 2. Skull
 3. Face
 - a. **Symmetry of expression**
 - b. **Appropriate facial expression**
 4. Eyes
 - a. Pupils size, shape and response
 - b. **Conjunctiva color and hydration**
 - c. "Raccoon eyes"
 5. Ears
 - a. Fluids
 - b. Cerebrospinal fluid (CSF)
 - c. Battle signs in mastoid region
 6. Nose
 - a. Symmetry
 - b. Fluid in nares
 7. Mouth and pharynx
 - a. Odor
 - b. **Hydration**
 - c. Condition of teeth/alignment
- C. Assess the neck, inspect and palpate to determine presence of injury/illness.
 1. Physical findings
 - a. Jugular venous distension (JVD)
 - b. Symmetry-tracheal deviation
 - c. **Masses**
 - d. Arterial pulses
 2. Consider application of cervical collar as appropriate

- D. Assess the chest in conjunction with the respiratory system to determine presence of injury/ illness
 - 1. Expose chest as appropriate
 - 2. Chest shape and symmetry-paradoxical motion
 - 3. Crepitus
 - 4. Respiratory effort
 - 5. Surface findings-inspection
 - 6. Auscultation
 - a. Technique-medical versus trauma
 - b. Check apices, mid-clavicular, high axillary
 - c. Lung sounds
 - (1) Presence-wheezes, other lung sounds
 - (2) Absence
 - 7. Anterior chest
 - a. Auscultation findings-lungs
 - b. Intercostal muscle use
 - c. Retraction
 - 8. Posterior chest
 - a. Auscultation
 - b. Spinal column
- E. Assess the abdomen to determine presence of injury/illness
 - 1. Position patient for examination
 - 2. Shape and size
 - 3. Palpation method
 - a. Four quadrants
 - b. Palpate affected area last
 - 4. Physical findings
 - a. Symmetry
 - b. Masses
 - c. Contour-distension
 - d. Firmness
 - e. Softness
 - f. Tenderness
 - g. Findings associated with pregnancy-physical changes of contour and shape
- F. Assess the pelvis, palpate and inspect to determine presence of illness/injury.
 - 1. Symmetry
 - 2. Tenderness
- G. Assess the lower extremities, palpate and inspect to determine presence of illness/injury
 - 1. Symmetry
 - 2. Surface findings
 - 3. Range of motion
 - 4. Circulation, motion, sensation (CMS)
 - 5. Peripheral vascular system

- a. Tenderness
 - b. Temperature of lower legs
 - c. Distal pulses
- H. Assess the upper extremities, palpate and inspect to determine presence of illness/injury
1. Symmetry
 2. Strength
 3. Surface findings
 4. Range of motion, if appropriate
 5. Circulation, motion, sensation (CMS)
 6. Arm drift
- I. Assess the back, palpate and inspect to determine presence of illness/injury
1. Roll patient while maintaining spinal precautions if appropriate.
 2. Symmetry
 3. Contour
 4. Surface findings
 5. Flank tenderness
 6. Spinal column tenderness
- J. Reevaluate field impression
- K. Reconsider transport decision, revise if needed
- L. Initiate management plan, consulting medical direction, per protocol
- M. Reconsider ALS if not done previously

Module 2

Patient Assessment

Lesson 2-5

Reassessment

OBJECTIVES

OBJECTIVES LEGEND

C=Cognitive P=Psychomotor A=Affective

1 = Knowledge level

2 = Application level

3 = Problem-solving level

COGNITIVE OBJECTIVES

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

- 2-5.1 Discuss the reasons for repeating the initial assessment as part of the **reassessment. (C-3)**
- 2-5.2 Describe the components of the **reassessment. (C-1)**
- 2-5.3 Describe trending of assessment components **and the need for comparing the baseline vitals to the reassessment of the vital signs (C-1)**

AFFECTIVE OBJECTIVES

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

- 2-5.4 Explain the value of performing **a reassessment. (A-1)**
- 2-5.5 Recognize and respect the feelings that patients might experience during assessment. (A-1)
- 2-5.6 Explain the value of trending assessment components to other health professionals who assume care of the patient. (A-1)

PSYCHOMOTOR OBJECTIVES

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

- 2-5.7 Demonstrate the skills involved in performing the **reassessment. (P-1,2)**

PRESENTATION

Declarative (What)

- I. Repeat **primary** assessment. For a stable patient, repeat and record every 15 minutes **or as deemed appropriate by the patient's condition**. For an unstable patient, repeat and record at a minimum every 5 minutes **or as often as practical depending on the patient's condition**.
 - A. Reassess mental status- **Is patient maintaining the same level of responsiveness of becoming more/less alert?**
 - B. Maintain open airway- **recheck airway for patency**
 - C. Monitor breathing for rate, **tidal volume** and quality-
 - D. Reassess pulse for rate and quality-**check both central and peripheral pulses**
 - E. Monitor skin color and temperature
 - F. Re-establish patient priorities

- II. Reassess and record vital signs
 - A. Include respirations, pulse, skin, blood pressure, pupils
 - B. Compare to the baseline established in earlier contact
- III. Repeat focused assessment regarding patient complaint or injuries
 - A. Question whether discomfort/pain remaining the same, getting better or worse
 - B. Question whether there are any new or previously undisclosed complaints
- IV. Recheck interventions
 - A. Assure adequacy of oxygen delivery/artificial ventilation
 - B. Assure management of bleeding
 - C. Assure adequacy of other interventions
 - D. Revise management plan if needed
- V. REVIEW performance at run critique

MODULE 2

Patient Assessment

Lesson 2-6

EMS System Communication

and

Therapeutic Communication

OBJECTIVES

OBJECTIVES LEGEND

C=Cognitive P=Psychomotor A=Affective

1 = Knowledge level

2 = Application level

3 = Problem-solving level

COGNITIVE OBJECTIVES

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

- 2-6.1 List the proper methods of initiating and terminating a radio call. (C-1)
- 2-6.2 State the proper sequence for delivery of patient information. (C-1)
- 2-6.3 Explain the importance of effective communication of patient information in the verbal report. (C-3)
- 2-6.4 Identify the essential components of the verbal report. (C-1)
- 2-6.5 Describe the attributes for increasing effectiveness and efficiency of verbal communications. (C-3)
- 2-6.6 State legal aspects to consider in verbal communication. (C-1)
- 2-6.7 Discuss the communication skills that should be used to interact with the patient. (C-3)
- 2-6.8 Discuss the communication skills that should be used to interact with the family, bystanders, individuals from other agencies while providing patient care and the difference between skills used to interact with the patient and those used to interact with others. (C-3)
- 2-6.9 List the correct radio procedures for all phases of a typical call: (C-1)
- 2-6.10 Define therapeutic communication. (C-1)
- 2-6.11 List the reasons why communication strategies may need to be altered (C-1)
- 2-6.12 Describe the interview techniques that are used to obtain information from patients. (C-1)
- 2-6.13 List verbal defusing strategies used with a hostile patient. (C-1)
- 2-6.14 Define the communication process and list the components of communication. (C-1)
- 2-6.15 Identify techniques to use in special interview situations. (C-1)

AFFECTIVE OBJECTIVES

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

- 2-6.16 Explain the rationale for providing efficient and effective radio communications and patient reports. (A-3)
- 2-6.17 Recognize the need to develop effective communication skills when interviewing patients. (A-3)

PSYCHOMOTOR OBJECTIVES

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

- 2-6.18 Perform a simulated, organized, concise radio transmission. (P-2)
- 2-6.19 Perform an organized, concise patient report that would be given to the staff at a receiving facility. (P-2)
- 2-6.20 Perform a brief, organized report that would be given to an ALS provider arriving at an incident scene at which the EMT was already providing care. (P-2)
- 2-6.21 Demonstrate interview techniques used to obtain information from patients. (P-1)

PRESENTATION

Declarative (What)

- I. EMS Communication System
 - A. Communication system
 - 1. System components
 - a. Base station - a radio which is located at a stationary site such as a hospital, mountain top, or public safety agency
 - b. Mobile two-way radios (transmitter/receivers)
 - (1) Implies a vehicular mounted device
 - (2) Mobile transmitters usually transmit at lower power than base stations (typically 20 - 50 watts)
 - (3) Typical transmission range is 10 - 15 miles over average terrain
 - c. Portable radios (transmitter/receivers)
 - (1) Implies a handheld device
 - (2) Typically have power output of 1 - 5 watts, limiting their range
 - d. Repeater/base station - receives a transmission from a low-power portable or mobile radio on one frequency and retransmits at a higher power on another frequency
 - e. Digital radio equipment
 - f. Cellular telephones
 - 2. Radio communications
 - a. Radio frequencies - assigned and licensed by the Federal Communication Commission (FCC)
 - b. Response to the scene
 - (1) The dispatcher needs to be notified that the call was received
 - (2) Dispatch needs to know that the unit is en route
 - (3) Other agencies should be notified as appropriate, e.g., local hospital
 - c. Arrival at the scene - the dispatcher must be notified
 - 3. Communication with medical direction
 - a. Medical direction may be at the receiving facility or at a separate site

- b. EMTs may need to contact medical direction for consultation and to get orders for administration of medications
 - c. Transmission must be organized, concise, pertinent
 - d. EMT must be accurate
 - e. Order must be repeated back word for word
 - f. Orders that are unclear or appear to be inappropriate should be questioned
4. Communication with receiving facilities
- a. Information from EMT allows hospitals to prepare for a patient's arrival by having the right room, equipment and personnel prepared
 - b. Patient reporting concepts
 - (1) When speaking on the radio, keep these principles in mind:
 - (a) Make sure radio is on and volume is properly adjusted
 - (b) Listen to the frequency and ensure it is clear before beginning a transmission
 - (c) Press the "press to talk" (PTT) button on the radio and wait for one second before speaking
 - (d) Speak with lips about 2 to 3 inches from the microphone
 - (e) Address the unit being called, then give the name of the unit (and number if appropriate) from where the transmission is originating
 - (f) The unit being called will signal that the transmission should start by saying "go ahead" or some other term standard for that area. A response of "stand by" means wait until further notice.
 - (g) Speak clearly and slowly, in a monotone voice
 - (h) Keep transmissions brief. If, on occasion, a transmission takes longer than 30 seconds, stop at that point and pause for a few seconds so that emergency traffic can use the frequency if necessary.
 - (i) Use clear text
 - (j) Avoid codes or agency-specific terms
 - (k) Avoid meaningless phrases like "be advised."
 - (l) Courtesy is assumed, so there is no need to say "please," "thank you" and "you're welcome."
 - (m) When transmitting a number that might be confused (e.g., a number in the teens), give the number, then give the individual digits

- (n) The airwaves are public and scanners are popular. Do not give a patient's name over the air. HIPAA Privacy Rule must be adhered to when sharing patient information.
 - (o) Remain objective and impartial in describing patients. An EMT may be sued for slander if he/she injures someone's reputation in this way.
 - (p) An EMT rarely acts alone: Use "we" instead of "I"
 - (q) Do not use profanity on the air. The FCC may impose substantial fines for its use.
 - (r) Avoid words that are difficult to hear like "yes" and "no." Use "affirmative" and "negative."
 - (s) Use the standard format for transmission of information
 - (t) When the transmission is finished, indicate this by saying "over." Get confirmation that the message was received.
 - (u) Avoid offering a diagnosis of the patient's problem
 - (v) Use EMS frequencies only for EMS communication
 - (w) Reduce background
- (2) Notify the dispatcher when the unit leaves the scene
- (3) When communicating with medical direction or the receiving facility, a verbal report should be given. The essential elements of such a report, are:
- (a) Identify unit and level of provider (who and what)
 - (b) Estimated time of arrival
 - (c) **Current patient condition**
 - (d) Patient's age and gender
 - (e) Chief complaint
 - (f) Brief, pertinent history of the present illness
 - (g) Major past illnesses
 - (h) Mental status
 - (i) Baseline vital signs
 - (j) Pertinent findings of the physical exam
 - (k) Emergency medical care given
 - (l) Response to emergency medical care
- (4) After giving this information, the EMT will continue to **reassess** the patient. **Per local protocol, any new information regarding patient's condition may be relayed to receiving facility.**
- (5) Arrival at the hospital

- (a) The dispatcher must be notified
 - (b) In some systems, the hospital should also be notified
 - (c) Verbal report when transferring patient custody to hospital staff
 - (i) Introduce patient (if known)
 - (ii) Chief complaint
 - (iii) Additional treatment given en route
 - (iv) Additional vital signs taken en route
 - (v) Give additional information that was collected but not transmitted
 - (6) Leaving the hospital for the station - the dispatcher should be notified
 - (7) Arrival at the station - the dispatcher should be notified
5. System maintenance
- a. Communication equipment needs to be checked periodically by a qualified technician, e.g., to ensure that a radio is not drifting from its assigned frequency
 - b. As technology changes, new equipment becomes available that may have a role in EMS systems, e.g., cellular phones
 - c. Since EMTs may need to be able to consult on-line medical direction, an EMS system must provide a back-up in case the usual procedures do not work
6. Phone/cellular communications
- a. Treat similarly to radio communications regarding content and strategies for delivery of pertinent information
 - b. EMT should be familiar with commonly utilized telephone numbers (medical control, emergency departments, dispatch centers)
 - c. EMT should be familiar with cellular technologies and knowledge of cellular dead spots in area
 - d. Backup plan necessary if cellular transmission fails during communication
- B. Written communication - this is covered in the lesson on documentation
- II. Therapeutic communication –a process in which the EMT consciously influences a patient or helps the patient to a better understanding through verbal or nonverbal communication. The process involves the use of specific strategies that encourage the patient to express feeling and ideas and that convey acceptance and respect.
- A. Interpersonal communication skills necessary to facilitate therapeutic communication.
- 1. Make and keep eye contact with the patient
 - 2. When practical position yourself at a level lower than the patient
 - 3. Be honest with the patient
 - 4. Be aware of your own body language

5. Speak clearly, slowly and distinctly
 6. List the patient's proper name
 7. If patient has difficulty hearing, speak clearly with lips visible
 8. Act and speak in a calm confident manner
- B. Principles of communicating with patients in a manner that achieves a positive relationship
1. Adjust communication strategies
 - a. Make sure verbiage is age-appropriate and consider stage of development
 - b. Consider patients with special needs (i.e. hearing-impairments)
 - c. Differing cultures
 - (1) Transcultural considerations
 - (a) introduce yourself the way in which you prefer to be addressed
 - (b) both the EMT and the patient will bring cultural stereotypes to a professional relationship
 - (c) ethnocentrism
 - (d) cultural imposition
 - (e) Consider personal space-intimate zone, personal distance, social distance, public distance
 - (f) cultural issues-variety of space, accept the sick role in different ways, nonverbal communication may be perceived differently
 - (i) Asians, Native Americans, Indochinese, Arabs may consider direct eye contact impolite or aggressive
 - (g) Touch
 - (h) Language barrier
 2. Interviewing techniques
 - a. Non-verbal skills
 - (1) Physical appearance of interviewer and patient
 - (2) Posture and gestures of interviewer and patient-facial expressions, eye contact, voice, touch
 - b. Using questions
 - (1) Open-ended questions
 - (2) Closed or direct questions
 - (3) Ask one question at a time and allow time for patient to answer
 - (4) Choose language the patient will understand
 - c. Hazards of interviewing
 - (1) Providing false assurance or reassurance
 - (2) Giving advice
 - (3) Leading or biased questions
 - (4) Talking too much

- (5) Interrupting
 - (6) Using “why” questions
 - (7) Authority
 - (8) Professional jargon
 - 3. Verbal diffusing strategies
 - a. Interviewing a hostile patient
 - (1) Building rapport with patient
 - (2) Maintain professional non-threatening demeanor
 - 4. Family presence issues
 - a. Situations
 - (1) Adult
 - (2) Children
 - (3) Elderly
 - b. Department policies
 - c. EMT response
 - d. Family preference
- C. Communication process and components
 - 1. Encoding
 - 2. Message
 - 3. Decoding
 - 4. Receiver
 - 5. Feedback
- D. Types of Responses
 - 1. Facilitation
 - 2. Silence
 - 3. Reflection
 - 4. Empathy
 - 5. Clarification
 - 6. Confrontation
 - 7. Interpretation
 - 8. Explanation
 - 9. Summary
- E. Developing patient rapport and ascertaining information
 - 1. Put the patient at ease
 - 2. Put yourself at ease
 - 3. Be aware of patient reactions
 - a. Resistance in answering
 - b. Shifting focus
 - c. Defense mechanisms
 - d. Distraction
- F. Special interview situations
 - 1. Patients unmotivated to talk
 - a. Most patients are more than willing to talk
 - b. Techniques to use
 - (1) Start the interview in the normal manner
 - (2) Attempt to use open-ended questions

- (3) Provide positive feedback
 - (4) Make sure the patient understands the questions
 - (5) Continue to ask questions
 - (6) Utilize language line if available
- 2. Patients under the influence of street drugs or alcohol
 - 3. Communication with elderly
 - a. Potential for visual deficit
 - b. Potential for auditory deficit
 - c. Obtain glasses and hearing aid
 - 4. Communication with pediatric patient
 - a. Use parent and caregiver
 - b. Clear explanations

MODULE 2

Patient Assessment

Lesson 2-7

Documentation

OBJECTIVES

OBJECTIVES LEGEND

C=Cognitive P=Psychomotor A=Affective

1 = Knowledge level

2 = Application level

3 = Problem-solving level

COGNITIVE OBJECTIVES

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

- 2-7.1 Explain the components of the written **and electronic patient care report (PCR)** and list the information that should be included in the **PCR**. (C-1)
- 2-7.2 Identify the various sections of the **PCR**. C-1)
- 2-7.3 Describe what information is required in each section of the prehospital **PCR** and how it should be entered. (C-1)
- 2-7.4 Define the special documentation considerations associated with patient refusal. (C-1)
- 2-7.5 Describe the legal implications associated with the written **and electronic PCR**. C-1)
- 2-7.6 Discuss all state and/or local record and reporting requirements. C-1)
- 2-7.7 Discuss elements of the HIPAA Privacy Rule as it pertains to prehospital patient care reporting. (C-1)
- 2-7.8 Describe documentation associated with special situations. (C-1)**

AFFECTIVE OBJECTIVES

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

- 2-7.9 Explain the rationale for patient care documentation. (A-3)
- 2-7.10 Explain the rationale for the EMS system gathering data. (A-3)
- 2-7.11 Explain the rationale for using medical terminology correctly. (A-3)
- 2-7.12 Explain the rationale for using an accurate and synchronous clock so that information can be used in trending. (A-3)

PSYCHOMOTOR OBJECTIVES

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

- 2-7.13 Complete a **PCR**. (P-2)

PRESENTATION

Declarative (What)

- I. Documentation
 - A. Minimum data set

1. Patient information gathered at time of EMT-B's initial contact with patient on arrival at scene, following all interventions and on arrival at facility
 - a. Chief complaint
 - b. Primary assessment
 - c. Vital signs
 - d. Patient demographics
 2. Administrative information
 - a. Time incident reported
 - b. Time unit notified
 - c. Time of arrival at patient
 - d. Time unit left scene
 - e. Time of arrival at destination
 - f. Time of transfer of care
 3. Accurate and synchronous clocks
- B. Prehospital care report
1. Functions
 - a. Continuity of care - a form that is not read immediately in the emergency department may very well be referred to later for important information
 - b. Legal document
 - (1) A good report has documented what emergency medical care was provided and the status of the patient on arrival at the scene and any changes upon arrival at the receiving facility
 - (2) The person who completed the form ordinarily must go to court with the form
 - (3) Information should include objective and subjective information and be clear
 - c. Educational - used to demonstrate proper documentation and how to handle unusual or uncommon cases
 - d. Administrative
 - (1) Billing
 - (2) Service statistics
 - e. Research
 - f. Evaluation and continuous quality improvement
 2. Use
 - a. Types
 - (1) Traditional written form with check boxes and a section for narrative
 - (2) Computerized version where information is filled in by means of an electronic device or over the internet
 - b. Sections
 - (1) Run data - date, times, service, unit, names of crew
 - (2) Patient data - demographics, assessment findings, care and changes in condition

- (3) Check boxes
 - (a) Be sure to fill in the box completely
 - (b) Avoid stray marks
 - (4) Narrative section (if applicable)
 - (a) Describe, don't conclude
 - (b) Include pertinent negatives
 - (c) Record important observations about the scene, e.g., suicide note, weapon, etc.
 - (d) Avoid radio codes
 - (e) Use abbreviations only if they are standard
 - (f) When information of a sensitive nature is documented, note the source of that information, e.g., communicable diseases
 - (g) State reporting requirements
 - (h) Be sure to spell words correctly, especially medical words
 - (i) For every reassessment, record time and findings
 - (5) Other state or local requirements
 - c. Confidentiality -be familiar with state laws regarding patient information. Health Information Portability and Accountability Act of 1996 (HIPPA) must be adhered to when reporting information (see Legal Issues lesson)
 - d. Distribution - local and state protocol and procedures will determine where the different copies of the form should be distributed
3. Falsification issues
- a. When an error of omission or commission occurs, document what did or did not happen and what (if any) steps were taken to correct the situation.
 - b. Falsification of information may lead not only to suspension or revocation of the EMT's certification/license, but also to poor patient care because other health care providers have a false impression of which assessment findings were discovered or what treatment was given
 - c. Specific areas of difficulty
 - (1) Vital signs - document only the vital signs that were actually taken
 - (2) Treatment - if a treatment like oxygen was overlooked, do not chart that the patient was given oxygen
- C. Documentation of patient refusal
- 1. Competent adult patients have the right to refuse treatment
 - 2. Before the EMT leaves the scene, however, he should:
 - a. Try again to persuade the patient to go to a hospital

- b. Ensure the patient is able to make a rational, informed decision
 - c. Inform the patient why he should go and what may happen to him if he does not
 - d. Consult medical direction as directed by local protocol
 - e. If the patient still refuses, document any assessment findings and emergency medical care given, then have the patient sign a refusal form
 - f. Have a family member, police officer or bystander sign the form as a witness. If the patient refuses to sign the refusal form, have a family member, police officer or bystander sign the form verifying that the patient refused to sign.
 - g. Complete the prehospital care report
 - (1) Complete the patient assessment
 - (2) If patient did not allow a complete assessment, document which assessments were completed
 - (3) Document the care the EMT wished to provide for the patient and what care was actually done
 - (4) Provide a statement that the EMT explained to the patient the possible consequences of failure to accept care, including potential death
 - (5) Offer alternative methods of gaining care
 - (6) State willingness to return
- D. Special situations/reports/incident reporting
- 1. Correction of errors
 - a. Errors discovered while the report form is being written
 - (1) Draw a single horizontal line through the error, initial it and write the correct information beside it
 - (2) Do not try to obliterate the error - this may be interpreted as an attempt to cover up a mistake
 - b. Errors discovered after the report form is submitted
 - (1) Preferably in a different color ink, draw a single line through the error, initial and date it and add a note with the correct information
 - (2) If information was omitted, add a note with the correct information, the date and the EMT's initials
 - (3) Use of addendums may be utilized for corrections
 - c. Errors discovered while/after completing an electronic report
 - (1) Most electronic patient care report systems have a method for entering and amending the report
 - (2) If there is no way to electronically submit change or addendum, one should follow the correction method used for a handwritten report that has already been submitted on the printout of the electronic report
 - 2. Multiple casualty incidents (MCI)

- a. When there is not enough time to complete the form before the next call, the EMT will need to fill out the report later
 - b. The local MCI plan should have some means of recording important medical information temporarily, e.g., triage tag, that can be used later to complete the form
 - c. The standard for completing the form in an MCI is not the same as for a typical call. The local plan should have guidelines.
3. Special situation reports
- a. Used to document events that should be reported to local authorities, or to amplify and supplement primary report
 - b. Should be submitted in timely manner and should include the names of all agencies, people and facilities involved
 - c. Should be accurate and objective; be descriptive and don't make conclusions
 - d. The EMT should keep a copy for his own records, as appropriate
 - e. The report, and copies, if appropriate, should be submitted to the authority described by local protocol
 - f. Exposure
 - g. Injury
4. Continuous quality improvement
5. Information gathered from the prehospital care report can be used to analyze various aspects of the EMS system
6. This information can then be used to improve different components of the system and prevent problems from occurring
7. **Drop report/transfer report**
- a. **Goal should be to provide a report prior to departing from the hospital-needs to contain minimum data set and a transfer signature**
 - b. **EMT should keep a copy of this transfer report for use as a reference during the primary patient care report and should submit the copy with the final patient care report**

MODULE 2

Patient Assessment

Lesson 2-8

Critical Thinking

OBJECTIVES

OBJECTIVES LEGEND

C=Cognitive P=Psychomotor A=Affective

1 = Knowledge level

2 = Application level

3 = Problem-solving level

COGNITIVE OBJECTIVES

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

- 2-8.1 Define the critical thinking process. (C-1)
- 2-8.2 Utilize the elements of critical thinking to formulate a field impression for the purpose of generating patient management plans. (C-2)
- 2-8.3 Describe the effects of the “fight or flight” response and the positive and negative effects on an EMT’s decision making. (C-1)
- 2-8.4 Summarize the “six Rs” of putting it all together: Read the patient, Read the scene, React, Reevaluate, Revise the management plan, Review performance. (C-1)

AFFECTIVE OBJECTIVES

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

- 2-8.5 Estimate the effects of the “fight or flight” response on the EMT in the field. (A-1)
- 2-8.6 Defend the position that clinical decision making is the cornerstone of effective EMT practice. (A-3)
- 2-8.7 Practice facilitating behaviors when thinking under pressure. (A-1)

PSYCHOMOTOR OBJECTIVES

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

- 2-8.8 Demonstrate the use of the six “Rs” of patient management in the prehospital setting. (P-2)
- 2-8.9 Demonstrate the use of the critical thinking process utilized in formulating a field impression for the purpose of generating a patient management plan. (P-2)

PRESENTATION

Declarative (What)

- I. Introduction
 - A. Being aware of critical thinking skills can enhance patient assessment and care
 - B. The out-of-hospital environment is unique
 - C. Prehospital work is heavily influenced by factors not present in other medical settings.

- II. The cornerstones of effective EMT practice
 - A. Gathering, evaluating, and synthesizing information
 - 1. Starts with dispatch information
 - 2. Scene size up- including weather, environment and clues from the scene
 - 3. **Primary** assessment
 - 4. **Secondary assessment and reassessment**
 - B. Developing and implementing appropriate patient management plans
 - 1. Solid foundation of knowledge
 - a. Disease processes
 - b. Injury patterns
 - 2. Past experience
 - 3. Attitude
 - a. Inquisitive
 - b. Jumps to conclusions
 - c. "Know it all"
 - C. Applying judgment and exercising independent decision making
 - 1. Develop a working assessment/field impression
 - 2. Apply protocols
 - 3. Contact medical control as needed
 - D. Thinking and working effectively under pressure
- III. Protocols, standing orders, and patient care algorithms
 - A. Define and outline performance parameters
 - B. Promote a standardized approach
 - C. Limitations of protocols, standing orders, and patient care algorithms
 - 1. Addresses only "classic" patient presentations
 - a. Non-specific patient complaints do not follow model
 - b. Limited clarity of presenting patient problems
 - 2. Does not address multiple disease etiologies
 - 3. Does not address multiple treatment modalities
 - 4. Promotes linear thinking (i.e. "cookbook medicine")
- IV. Components, stages, and sequence of critical thinking process for EMTs
 - A. Concept formation
 - 1. MOI/scene **size-up**
 - 2. **Primary and secondary assessments**
 - 3. Chief complaint
 - 4. Patient history
 - 5. Patient affect
 - 6. Technical tools
 - a. Pulse oximetry
 - b. Glucose monitoring
 - c. Other
 - B. Data interpretation
 - 1. Data gathered
 - 2. EMT knowledge of anatomy, physiology and pathophysiology
 - 3. EMT attitude

4. Previous experience of the EMT
- C. Application of principle
 1. Working assessment / field impression
 2. Protocols / standing orders
 3. Treatment / intervention
- D. Evaluation is a continual process which includes:
 1. Reassessment of patient
 2. Revision of impression and treatment / intervention
- E. Reflection on action
 1. Run critique
 2. Addition to or modification of EMT's experience
- V. Fundamental elements of critical thinking for EMTs
 - A. Adequate fund of knowledge
 1. Anatomy, physiology and pathophysiology
 2. Signs and symptoms
 3. Protocols
 4. Medications
 - B. Ability to focus on specific and multiple elements of data
 1. Scene size up and all that it entails
 2. Patient assessment
 - C. Ability to gather and organize data and form working assessment / field impression
 - D. Ability to identify and deal with medical ambiguity
 1. Patients whose signs and symptoms may not fall into the normal presentation
 2. Patients who have multiple working assessments / field impressions
 - E. Ability to differentiate between relevant and irrelevant data
 - F. Ability to analyze and compare similar situations
 - G. Ability to recall contrary situations
 - H. Ability to articulate assessment based decisions and construct arguments
- VI. Considerations with field application of assessment-based patient management
 - A. The patient acuity spectrum
 1. EMS is activated for countless reasons
 2. Few out-of-hospital calls are true life-threatening emergencies
 - a. Minor medical and traumatic events require little critical thinking and in turn the decisions are relatively easy
 - b. Patients with obvious life-threats pose limited critical thinking challenges
 - c. Patients who fall on the acuity spectrum between minor and life-threatening pose the greatest critical thinking challenge
 - B. Thinking under pressure
 1. Hormonal influence (i.e. "fight or flight" response) impacts the EMT's decision making both positively and negatively
 - a. Enhanced visual and auditory acuity
 - b. Improved reflexes and muscle strength

- c. Impaired critical thinking skills
 - d. Diminished concentration and assessment ability
 - 2. Mental conditioning is the key to effective performance under pressure
 - a. Skills learned at a pseudo-instinctive performance level (e.g. performing CPR)
 - b. Automatic response for technical treatment requirements (e.g. blood glucose monitor)
- C. Mental checklist for thinking under pressure
 - 1. Stop and think
 - 2. Scan the situation
 - 3. Decide and act
 - 4. Maintain clear, concise control
 - 5. Regularly and continually reevaluate the patient
- D. Facilitating behaviors for thinking under pressure
 - 1. Stay calm, don't panic
 - 2. Assume and plan for the worst; err on the side of the patient
 - 3. Maintain a systematic assessment pattern
 - 4. Balance styles
 - a. Situation analysis
 - (1) Reflective - gather and organize data to form working assessment/field impression
 - (2) Impulsive - "knee-jerk response" without gathering and organizing all the facts
 - b. Data processing
 - c. Divergent (various ways to do something) vs Convergent (one way to do something)
 - d. Decision making
 - (1) Anticipatory - staying "ahead of the 8-ball"
 - (2) Reactive - being "behind the 8-ball"
- E. Putting it all together – "**The Six R's**"
 - 1. **Read** the scene
 - a. Safety issues and hazards
 - b. General environmental conditions
 - c. Evaluate immediate surroundings
 - d. Mechanism of injury/nature of illness
 - 2. **Read** the patient
 - a. Observe the patient
 - (1) Level of responsiveness/consciousness/distress
 - (2) Skin color
 - (3) Position and location of patient - obvious deformity or asymmetry
 - b. Talk to the patient
 - (1) Determine the chief complaint
 - (2) New problem or worsening of preexisting condition
 - c. Touch the patient

- (1) Skin temperature and moisture
- (2) Pulse rate, strength and regularity
- d. Auscultate the patient
 - (1) Identify problems with the lower airway
 - (2) Identify problems with the upper airway
- e. Status of ABC's - identify life-threats
- f. Complete an accurate set of vital signs
 - (1) Use trending as triage tool to estimate severity
 - (2) Can assist in identifying the majority of life-threatening conditions
 - (3) Influenced by patient age, underlying physical and medical conditions, and current medications
- 3. **React**
 - a. Address life-threats in the order they are found - ABC's
 - b. Determine the most common and statistically probable cause of MOI/NOI that fits the patient's initial presentation (signs and symptoms)
 - c. Consider the most serious condition or cause that fits the patient's initial presentation (signs and symptoms)
 - d. If a clear medical problem is elusive, treat based on presenting signs and symptoms
- 4. **Reevaluate**
 - a. Focused, detailed and ongoing assessments
 - b. Response to initial management/ interventions
 - c. Discovery of less obvious problems
- 5. **Revise** management plan - If what you are doing isn't working, try something else! Come up with revised working assessment/field impression and/or management plan
- 6. **Review** performance at run critique
 - a. Formal
 - b. Informal
 - c. Patients with obvious life-threats pose limited critical thinking challenges
 - d. Patients who fall on the acuity spectrum between minor and life-threatening pose the greatest critical thinking challenge

MODULE 2

Patient Assessment

Lesson 2-9

Evaluation: Patient Assessment

OBJECTIVES

OBJECTIVES LEGEND

C=Cognitive P=Psychomotor A=Affective

1 = Knowledge level

2 = Application level

3 = Problem-solving level

COGNITIVE OBJECTIVES

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

Demonstrate knowledge of the cognitive objectives of Lesson 2-1: Scene Size-up.

Demonstrate knowledge of the cognitive objectives of Lesson 2-2: **Primary Assessment.**

Demonstrate knowledge of the cognitive objectives of Lesson 2-3: **History-Taking, Vital Signs and Monitoring Devices**

Demonstrate knowledge of the cognitive objectives of Lesson 2-4: **Secondary Assessment.**

Demonstrate knowledge of the cognitive objectives of Lesson 2-5: **Reassessment.**

Demonstrate knowledge of the cognitive objectives of Lesson 2-6: **EMS System Communication/Therapeutic Communication.**

Demonstrate knowledge of the cognitive objectives of Lesson 2-7: Documentation.

Demonstrate knowledge of the cognitive objectives of Lesson 2-8: Critical Thinking.

AFFECTIVE OBJECTIVES

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

Demonstrate knowledge of the affective objectives of Lesson 2-1: Scene Size-up.

Demonstrate knowledge of the affective objectives of Lesson 2-2: **Primary Assessment.**

Demonstrate knowledge of the affective objectives of Lesson 2-3: **History-Taking, Vital Signs and Monitoring Devices.**

Demonstrate knowledge of the affective objectives of Lesson 2-4: **Secondary Assessment.**

Demonstrate knowledge of the affective objectives of Lesson 2-5: **Reassessment.**

Demonstrate knowledge of the affective objectives of Lesson 2-6: **EMS System Communication/Therapeutic Communication.**

Demonstrate knowledge of the affective objectives of Lesson 2-7: Documentation.

Demonstrate knowledge of the affective objectives of Lesson 2-8: Critical Thinking.

PSYCHOMOTOR OBJECTIVES

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

Demonstrate knowledge of the psychomotor objectives of Lesson 2-1: Scene Size-up.

Demonstrate knowledge of the psychomotor objectives of Lesson 2-2: **Primary Assessment.**

Demonstrate knowledge of the psychomotor objectives of Lesson 2-3: History-Taking, Vital Signs and Monitoring Devices

Demonstrate knowledge of the psychomotor objectives of Lesson 2-4: **Secondary Assessment.**

Demonstrate knowledge of the psychomotor objectives of Lesson 2-5: **Reassessment.**

Demonstrate knowledge of the psychomotor objectives of Lesson 2-6: **EMS System Communication/Therapeutic Communication.**

Demonstrate knowledge of the psychomotor objectives of Lesson 2-7: Documentation.

Demonstrate knowledge of the psychomotor objectives of Lesson 2-8: Critical Thinking.

MODULE 3

Airway

Lesson 3-1

Airway Management, Respiration and Artificial Ventilation

OBJECTIVES

OBJECTIVES LEGEND

C=Cognitive P=Psychomotor A=Affective

1 = Knowledge level

2 = Application level

3 = Problem-solving level

COGNITIVE OBJECTIVES

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

- 3-1.1 Identify the primary anatomical structures and function of the respiratory system. (C-2)
- 3-1.2 Describe anatomical and physiological differences between the airway of pediatrics and adults. (C-1)
- 3-1.3 Define pulmonary ventilation. (C-1)
- 3.1.4 Discuss alveolar ventilation in terms of tidal volume, dead space, vital capacity, minute volume and residual volume. (C-1)
- 3.1.5 Define respiration. (C-1)
- 3-1.6 Discuss key pathophysiological occurrences involving the respiratory system. (C-3)
- 3-1.7 List the signs of an adequate and inadequate airway. (C-1)
- 3-1.8 Describe important respiratory problems encountered with infants and children. (C-1)
- 3-1.9 Discuss assessment of ventilation. (C-1)
- 3-1.10 Discuss assessment of respiration. (C-1)
- 3-1.11 List the various techniques of assuring a patent airway. (C-1)
- 3-1.12 Discuss various management techniques of inadequate respiration and ventilation. (C-1)
- 3-1.13 Describe the components of an oxygen delivery system. (C-1)
- 3-1.14 Compare the rationale for the use of various oxygen delivery devices. (C-3)
- 3-1.15 Discuss assisting ventilations for a patient in respiratory distress/failure. (C-3)
- 3-1.16 Differentiate between normal ventilation and positive pressure ventilation. (C-1)

AFFECTIVE OBJECTIVES

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

- 3-1.17 Explain the rationale for basic life support artificial ventilation and airway protective skills taking priority over most other basic life support skills. (A-3)
- 3-1.18 Explain the rationale for providing adequate oxygenation through high inspired oxygen concentrations. (A-1)

PSYCHOMOTOR OBJECTIVES

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

- 3-1.19 Demonstrate the steps in performing the head-tilt chin-lift. (P-1,2)
- 3-1.20 Demonstrate the steps in performing the jaw thrust. (P-1,2)
- 3-1.21 Demonstrate the steps in foreign body airway obstruction removal. (P-2)
- 3-1.22 Demonstrate the techniques of suctioning. (P-1,2)
- 3-1.23 Demonstrate the technique involved in the use of the laryngoscope and Magill forceps (C-1)
- 3-1.24 Demonstrate the use of a bag-valve-mask. (P-1,2)
- 3-1.25 Demonstrate the operation of oxygen tanks and regulators. (P-2)
- 3-1.26 **Demonstrate how to provide supplemental oxygen, utilizing select oxygen administration equipment. (C-1)**
- 3-1.27 Demonstrate the steps in artificially ventilating various patients. (P-1)
- 3-1.28 Demonstrate how to utilize various airway adjuncts. (P-1,2)
- 3-1.29 Demonstrate the technique of “blow by” administration of oxygen. (P-1)

PRESENTATION**Declarative (What)**

- I. Airway anatomy
 - A. Upper and lower structures
 - 1. Nasal cavity - humidifies, warms and filters air
 - 2. Oral cavity – airway passage
 - 3. Pharynx
 - a. Oropharynx – posterior to oral cavity
 - b. Nasopharynx - posterior to nasal cavity
 - c. **Laryngopharynx**
 - 4. Epiglottis - a leaf-shaped structure that prevents food and liquid from entering the trachea during swallowing
 - 5. Larynx – protects vocal cords; vocal cords dividing line between upper and lower airway
 - a. Thyroid cartilage – cartilage ring forming the superior portion of the larynx
 - b. Cricoid cartilage - cartilage ring forming the **inferior** portion of the larynx
 - 6. Trachea – **hollow tube supported by cartilage rings, passageway to lower airway**
 - 7. Carina – bifurcation of the trachea into the two mainstem bronchi
 - 8. Bronchi - two major branches of the trachea moving air into the lungs
 - 9. **Lungs**
 - a. Bronchioles - smaller divisions of the bronchi serving as air passage

- b. Alveoli - single cell membrane structures where gas exchange occurs; surrounded by capillary blood vessels; interface with capillary beds
 - c. Pulmonary capillary beds – blood vessels that surround each alveolus; with adequate blood volume and blood pressure, the vessels return oxygenated blood to the heart
- B. Chest cage (thoracic cavity)
- 1. Ribs
 - 2. Muscles
 - a. Intercostal
 - b. Diaphragm
 - (1) Inhalation (active phase)
 - (a) Diaphragm and intercostal muscles contract, increasing the size of the thoracic cavity
 - (i) diaphragm moves slightly downward, flares lower portion of rib cage
 - (ii) ribs move upward/outward
 - (b) Air flows into the lungs
 - (2) Exhalation (passive phase)
 - (a) Diaphragm and intercostal muscles relax, decreasing the size of the thoracic cavity
 - (i) diaphragm moves upward
 - (ii) ribs move downward/inward
 - (b) Air flows out of the lungs
3. Pleura linings-glistening tissue that aids in movement of lungs in
 - a. The chest cavity
 - b. Visceral-covers the lungs
4. Parietal-lines the chest wall
5. Phrenic nerve – innervates the diaphragm; needed for breathing to occur
- C. Vascular structures supporting respiration
- 1. Pulmonary capillary structures
 - 2. The heart
 - a. Right heart
 - (1) receives systemic circulation
 - (2) drives pulmonary circulation
 - b. Left heart
 - (1) receives pulmonary circulation
 - (2) drives systemic circulation
 - c. Automaticity
 - 3. Arteries, arterioles, capillaries, venules, veins
 - 4. Tissue/cellular beds
- D. Cells
- 1. All cells perform a specific function
 - 2. Cells require chemicals in order to function, including oxygen, glucose, and electrolytes

- a. Cells must excrete waste products, including carbon dioxide and water
 - b. Aerobic versus anaerobic respiration
- E. Infant and child anatomy
- 1. Mouth and nose – Generally, structures are smaller and more easily blocked by secretions and airway swelling
 - 2. Pharynx - infants' and children's tongues take up proportionally more space in the mouth than adults, and can block the upper airway
 - 3. Trachea
 - a. Infants and children have narrower tracheas that are obstructed more easily by swelling
 - b. The trachea is softer and more flexible in infants and children
 - c. Positioning the airway is different in infants and children, do not hyperextend the neck (consider use of a folded towel placed under shoulder blades to maintain a “sniffing-position”)
 - d. Cricoid cartilage - like other cartilage in the infant and child, the cricoid cartilage is less developed and less rigid
 - e. Diaphragm - chest wall is softer, infants and children tend to depend more heavily on the diaphragm for breathing
- II. Physiology of respiration
- A. Pulmonary ventilation
- 1. Ventilation is the movement of air in and out of the lungs
 - 2. Adequate ventilation is necessary for, but does not assure, adequate respiration
 - 3. Mechanics of ventilation
 - a. Inhalation
 - b. Exhalation
 - c. Respiratory cycle – equals one inhalation and one exhalation
 - 4. Alveolar ventilation
 - a. Tidal volume
 - (1) The volume of air normally inhaled/exhaled during each respiratory cycle
 - (2) Estimated to be approximately 500 mL of air in an adult (5-7mL/kg)
 - (3) Maintaining an adequate tidal volume in patients with respiratory distress will help to exchange greater volumes of oxygen and carbon dioxide
 - (4) Adequate tidal volume is paramount when performing assisted ventilations for patients in severe respiratory distress and respiratory arrest
 - b. Dead space
 - (1) The volume of air within specific respiratory structures that is not available for gas exchange

- (2) Areas making up dead space include all structures from the nasal cavity and oral cavity down through and including the bronchioles
 - (3) Estimated dead space volume for an adult is 150 mL
 - c. Volume of air available for gas exchange - approximately 350 mL (tidal volume – dead space = air available for gas exchange)
 - d. **Vital capacity – amount of air that can be forcibly expelled from the lungs after breathing in as deeply a possible**
 - e. Normal respiratory rate
 - (1) Normal rate
 - (a) Adult - 12-20/minute
 - (b) Child - 15-30/minute
 - (c) Infant - 25-50/minute
 - f. **Minute volume – volume of air moved through the lungs in 1 minute minus dead space (tidal volume (minus dead space) x respiratory rate**
 - g. **Residual volume – air remaining in the lungs after maximal expiration**
- B. **Oxygenation**
1. **Oxygenation is the process of loading oxygen molecules onto hemoglobin molecules in the bloodstream**
 2. **Oxygenation is required for, but does not assure internal respiration**
- C. **Respiration**
1. **Respiration is the exchange of oxygen and carbon dioxide and is essential for life**
 - a. **External respiration – exchange of oxygen and carbon dioxide between the alveoli and the blood in the pulmonary capillaries (alveolar/capillary exchange)**
 - b. **Internal respiration – exchange of oxygen and carbon dioxide between the capillaries of the body tissues and the individual cells (capillary/cellular exchange)**
 - c. **Cellular respiration and metabolism**
 - (1) **Each cell of the body performs a specific function**
 - (2) **Use of oxygen and carbohydrates are essential to produce energy for cells to perform their function**
 - (3) **Carbon dioxide and water are produced as by-products of metabolism**
 2. **Adequate ventilation is required for but does not assure external respiration**
 3. **Adequate external ventilation and perfusion are required for but do not assure internal respiration**
 4. **Respiratory regulation – influenced by carbon dioxide and oxygen levels in the blood and spinal fluid**
- 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 reactions
 - e. Unconsciousness (loss of muscle tone)
- B. Oxygenation
- C. Respiration
1. External
 - a. Altitude
 - b. Closed environments
 - c. Toxic or poisonous environments
 2. Internal
 - a. Pathology typically related to changes in alveolar – capillary gas exchange
 - b. Typical disease processes
 - (1) Emphysema
 - (2) Pulmonary edema
 - (3) Pneumonia
 - (4) Environmental/occupational exposure
 - (5) Drowning
 3. Cellular
- D. Circulation compromise
1. Pathology typically related to derangement of pulmonary and systemic perfusion and oxygenation
 2. Typical disease processes
 - a. Obstruction of blood flow
 - (1) Pulmonary embolism
 - (2) Tension pneumothorax
 - (3) Heart failure
 - (4) Cardiac tamponade
 - b. Anemia
 - c. Hypovolemia
 - d. Vasodilatory shock
- E. Cells
1. Hypoxia
 2. Hypoglycemia
 3. Infection
- IV. Airway assessment
- A. Signs of adequate airway

1. Airway is open, can hear/feel air move in and out
 2. Patient is speaking in full sentences
 3. Sound of the voice is normal for the patient
- B. Signs of inadequate airway (*not every sign listed below is present in every patient who has an inadequate airway*)
1. Unusual sounds are heard with breathing
 - a. Stridor
 - b. Snoring
 2. Awake patient is unable to speak or sounds hoarse
 3. No air movement (apnea)
 4. Airway obstruction
 - a. Tongue
 - b. Food
 - c. Vomit
 - d. Blood
 - e. Teeth
 - f. Foreign body
 - g. Swelling due to trauma/infection
 5. **Infants and Children** - Signs of increased effort of breathing (early respiratory distress). Children can compensate well for short periods of time by increasing breathing rate and effort of breathing. Compensation is followed rapidly by decompensation due to rapid respiratory muscle fatigue and general fatigue
 - a. Nasal flaring
 - b. Intercostal, supraclavicular, and/or subcostal retractions
 - c. Stridor
 - d. Audible wheezing
 - e. Grunting
 6. **Infants and Children** - signs of early respiratory distress plus any of the following:
 - a. Respiratory rate greater than 60 breaths per minute
 - b. Cyanosis
 - c. Decreased muscle tone
 - d. Severe use of accessory muscles
 - e. Poor peripheral perfusion
 - f. Altered mental status
 7. **Infants and children** – signs of respiratory arrest
 - a. Breathing rate less than 10 per minute
 - b. Limp muscle tone
 - c. Unconscious
 - d. Slower, absent heart rate
 - e. Weak or absent distal pulses
 8. **Infant and children** – signs of airway obstructions
 - a. Partial obstruction
 - (1) Alert
 - (2) Stridor (inspiratory vs. expiratory), crowing, noisy

- (3) Retractions on inspiration
- (4) Pink skin
- (5) Good peripheral perfusion
- (6) Emergency medical care
 - (a) Allow position of comfort
 - (b) Offer oxygen
 - (c) Transport
 - (d) Do not agitate child
 - (e) Limit physical exam.
 - (f) Do not assess blood pressure.
- b. Complete obstruction
 - (1) Altered mental status
 - (2) No crying or speaking
 - (3) Cyanosis
 - (4) Ineffective cough
 - (5) Increased respiratory difficulty
 - (6) Stridor
 - (7) Unconsciousness
 - (8) Emergency medical care
 - (a) Clear airway
 - (b) Attempt artificial ventilations with a bag-valve-mask

V. Assessment of ventilation

- A. Internal respiration is necessary for life
- B. It is sometimes difficult to assess internal respiration
- C. It may be difficult to determine if you have a respiration, ventilation, or oxygenation problem as they may coexist and one can cause another
- D. Assessment of ventilation
 - 1. Signs of adequate ventilation
 - a. Respiratory rate is normal
 - b. Breath sounds are clear on both sides of the chest
 - (1) Anterior
 - (2) Posterior
 - c. Tidal volume – adequate depth
 - d. Minute volume
 - e. Minimal effort
 - f. Chest expansion adequate and equal
 - g. Rhythm of respiratory cycle is regular
 - 2. Signs of inadequate ventilation (*not every sign listed below is present in every patient who has inadequate ventilation and/or oxygenation*)
 - a. Abnormal work of breathing
 - (1) Retractions
 - (2) Nasal flaring
 - (3) Abdominal breathing
 - (4) Diaphoresis

- (5) Increased effort of breathing
 - (6) Use of accessory muscles
 - b. **Abnormal breath sounds**
 - (1) **Stridor**
 - (2) **Wheezing**
 - (3) **Crackles**
 - (4) **Silent chest**
 - (5) **Breath sounds are unequal**
 - (a) **Trauma**
 - (b) **Infection**
 - (c) **Pneumothorax**
 - c. **Minute volume (respiratory rate x tidal volume)**
 - d. **Chest wall movement or damage**
 - (1) **Trauma or illness**
 - (a) **Paradoxical**
 - (b) **Splinting**
 - (c) **Penetrating**
 - (d) **Use of accessory muscles**
 - e. **Irregular respiratory pattern**
 - (1) **Head trauma**
 - (2) **Stroke**
 - (3) **Metabolic**
 - (4) **Toxic**
 - (5) **Rapid respiratory rate without clinical improvement**
 - f. **Rate – slower or faster than normal ranges**
 - g. **Agonal respirations – occasional gasping breaths**
 - h. **Pale or cyanotic, cool and clammy skin**
- E. **Assessment of respiration**
- 1. **Ambient air is abnormal**
 - a. **Enclosed space**
 - b. **High altitude**
 - c. **Poison gas**
 - 2. **Level of consciousness**
 - 3. **Skin color/mucosa is not normal**
 - a. **Cyanosis – etiology**
 - b. **Pallor – etiology**
 - c. **Mottling – etiology**
 - 4. **Assessment of oxygenation**
 - a. **Mental status – baseline and reevaluation**
 - b. **Skin color normal**
 - c. **Oral mucosa normal**
 - d. **Pulse oximeter reading within acceptable level**
- VI. **Techniques of assuring a patent airway**
- A. **Manual airway maneuvers**
 - 1. **Opening the airway**

- a. Head-tilt chin-lift when no neck injury suspected (refer to current AHA guidelines)
- b. Jaw thrust when EMT suspects spinal injury (refer to current AHA guidelines)
- c. Assess need for suctioning
2. Removal of foreign body airway obstructions (FBAO)-(refer to current AHA guidelines)
- B. **Mechanical airway devices (refer to current Wisconsin Standards and Procedures of Practical Skills Manual)**
 1. Oropharyngeal airway - used to assist in maintaining an open airway by displacing the tongue away from the oropharynx, allowing air exchange to occur. Gag reflex is contraindication for use.
 2. Nasopharyngeal airway - used to assist in maintaining an open airway of patient with an intact gag reflex. Head injuries with CSF present are contraindication for use. It should be utilized with extreme caution with infants and small children due to a huge increase in resistance and therefore work of breathing.
- C. **Relief of foreign body airway obstruction**
 1. Refer to current AHA guidelines for manual techniques
 2. Laryngoscope and magill Forceps – used by the EMT to visualize and remove foreign body airway obstruction
- D. **Upper airway suctioning and techniques**
 1. Purpose
 - a. Remove blood, other liquids and food particles from the airway
 - b. Some suction units are inadequate for removing solid objects like teeth, foreign bodies and food
 - c. A patient needs to be suctioned immediately when a gurgling sound is heard with artificial ventilation
 2. Types of units
 - a. Suction devices
 - (1) Mounted
 - (2) Portable
 - (a) Electrical
 - (b) Hand operated
 - b. Suction catheters
 - (1) Hard or rigid ("tonsil tip")
 - (a) Used to suction the mouth and oropharynx of an unresponsive patient
 - (b) Should be inserted only as far as you can see
 - (c) Use rigid catheter for infants and children, but take caution not to touch back of airway
 - (2) Soft (French)
 - (a) Useful for suctioning the nasopharynx and in other situations where a rigid catheter cannot be used

- (b) Should be measured so that it is inserted only as far as the base of the tongue

VII. Management of inadequate respiration and ventilation

A. Assure an adequate airway

B. Supplemental oxygen therapy

1. Ambient air is

a. Oxygen

b. Nitrogen

c. Carbon dioxide

2. Supplemental oxygen therapy replaces some of the inert gas with oxygen and can improve internal respiration; given to diminish hypoxia

3. Oxygen sources

a. Oxygen cylinders sizes

(1) D cylinder has 350 liters

(2) E cylinder has 625 liters

(3) M cylinder has 3,000 liters

(4) G cylinder has 5,300 liters

(5) H cylinder has 6,900 liters

b. Need to handle carefully since content is under pressure

c. Cylinders should be positioned to prevent falling and blows to the valve-gauge assembly and secured during transport

d. Pressure regulators and changing cylinders

(1) Full cylinder approximately 2000 psi. Varies with ambient temperature

(2) Safe residual for operation is 200 psi

(3) Calculating cylinder duration

e. Operating procedures (refer to current Wisconsin Standards and Procedures of Practical Skills Manual)

4. Liquid oxygen-typically not utilized in the prehospital setting

5. Oxygen delivery devices

a. Nonrebreather (NRB) mask

(1) Preferred method of giving oxygen to pre-hospital patients in management of hypoxia

(2) Includes reservoir bag attached to the mask with a one-way valve preventing the patient's exhaled air from mixing with the oxygen in the reservoir; two rubber washers cover exhalation ports

(3) Up to 90% oxygen delivered

(4) Nonrebreather bag must be fully inflated before mask is placed on patient

(5) Flow rate should be adjusted so that when patient inhales, bag does not collapse ("high flow", approximately 12-15 lpm)

(6) Patients who are cyanotic, cool, clammy or short of breath need oxygen. Concerns about the dangers of

giving too much oxygen to patients with history of chronic obstructive pulmonary disease (COPD) and infants and children have not been shown to be valid in the prehospital setting. Patients with COPD and infants and children who require oxygen should receive high concentration oxygen. Masks come in different sizes for adult, children and infants.

- b. Nasal cannula
 - (1) Should be used when patients will not tolerate a nonrebreather mask and high-flow oxygen is not indicated
 - (2) Flow rate should be 1-6 lpm and can deliver 24- 44% oxygen
 - (3) Nasal cannula is not well tolerated by infants and younger children. Consider utilizing a “blow by” technique for pediatric oxygen administration
- c. **Partial rebreather face mask**
 - (1) **Used to provide oxygen to patients who are hyperventilating**
 - (2) **Similar to a nonrebreather mask without a one-way valve between the mask and reservoir; includes a two-way valve between the mask and reservoir, enabling patient to rebreathe approximately 1/3 of exhaled air**
 - (3) **Patients rebreathe a small amount of exhaled air when using this mask**
 - (4) **Flow rate should be 6-10 lpm and can deliver between 40-60% oxygen**
- d. **Tracheostomy mask**
 - (1) **Used to administer oxygen through tracheostomy site; patients with tracheostomies do not breathe through their mouth and nose**
 - (2) **May not be available in prehospital care; improvise by placing a pediatric nonrebreather mask over the stoma (surgical breathing opening in neck)**
- e. **Venturi mask**
 - (1) **Utilized to deliver various percentages of oxygen to the patient while a constant flow is maintained from the regulator**
 - (2) **Venturi systems have a number of attachments that enable fine adjustments to be made in oxygen percentages**
 - (3) **May not be available in the prehospital setting**
- f. **Humidifiers**

- (1) Humidified oxygen may be used for patients during extended transports; dry oxygen is typically indicated for short-term, prehospital use
 - (2) Humidification systems consist of a small bottle of water that oxygen passed through, providing moisturized oxygen to the patient
 - (3) Humidifiers need to be kept in an upright position, therefore only used for fixed oxygen units in ambulance
 - (4) May not be available in the prehospital setting
- C. **Assisting ventilation in respiratory distress/failure**
1. **Purpose**
 - a. To improve oxygenation
 - b. To improve ventilation
 2. **Indications**
 - a. Shows signs and symptoms of inadequate ventilation
 - (1) Altered mental status
 - (2) Inadequate minute ventilation
 - (3) Fatigue from work of breathing
 - (4) Others-i.e. poor perfusion, inadequate tidal volume
 3. **Complications**
 - a. Combative/hypoxic patients
 - b. Inadequate mask seal
 - c. Over pressure causing injury to the lung
 - d. Risk of gastric inflation and vomiting
 4. **Procedure**
 - a. Utilize a positive pressure ventilation device (PPVD)
 - b. Explain the procedure to the patient
 - c. Place the mask over the patient's nose and mouth
 - d. Initially assist at the rate at which the patient has been breathing
 - e. Deliver a ventilation each time the patient begins to inhale
 - f. Over the next 5-10 breaths
 - (1) Slowly adjust the rate and the delivered tidal volume
 - (2) Appropriate rate and volume are determined by minute ventilation
- D. **Management of ventilations/respiratory arrest**
1. **Assures an adequate airway**
 - a. **Signs of adequate artificial ventilation**
 - (1) Chest rise and fall
 - (2) Return of normal heart rate
 - (3) Improvement of skin color
 - b. **Signs of inadequate artificial ventilation**
 - (1) No chest rise and fall
 - (2) Abnormal heart rate
 - (3) Poor skin color

2. Utilize supplemental oxygen therapy
3. Artificial ventilation devices (Refer to current AHA guidelines and/or Wisconsin Standard and Procedures of Practical Skills Manual)
 - a. Mouth-to-mask
 - b. Bag-valve-mask (BVM) with reservoir—utilized to assist ventilations in patients with severe respiratory distress or in full respiratory arrest
 - (1) The bag-valve-mask consists of a self-inflating bag, one-way valve, face mask, oxygen reservoir and needs to be connected to oxygen to perform most effectively.
 - (2) Bag-valve-mask characteristics
 - (a) Volume of approximately 1,600 milliliters available for adults
 - (b) Provides less volume than mouth-to-mask
 - (c) Position self at top of patient's head for optimal performance
 - (d) A self-refilling bag
 - (e) A non-jam valve that allows a maximum oxygen inlet flow of 15/lpm
 - (f) No pop-off valve, or the pop-off valve must be disabled to avoid inadequate artificial ventilations.
 - (g) Standardized 15/22 mm fittings
 - (h) An oxygen inlet and reservoir to allow for high concentration of oxygen
 - (i) A true valve for nonrebreather
 - (j) Should perform in all environmental conditions and temperature extremes
 - (k) Available in infant, child and adult sizes.
 - (3) Consider modification of technique when patient presents with suspected spinal injury
 - c. Special considerations
 - (1) Infant and pediatric patients
 - (a) Place head in sniffing/neutral position; utilize a folded towel to achieve and maintain airway position.
 - (b) Ventilate with bag-valve-mask until adequate chest rise occurs. Do not use pop-off valve, must be disabled (placed in closed position) in order to adequately ventilate
 - (c) (e) Gastric distention is more common
 - (d) (f) An oral or nasal airway may be considered
 - (2) Patients with laryngectomies (stomas)

- (a) A breathing tube may be present. If it is obstructed, suction it. If a back-up tube is available, transport it with the patient.
 - (b) Ventilate the patient by placing the mask directly over the stoma and creating a tight, leak-free seal. Head and neck in neutral position.
 - (c) Some patients have a partial laryngectomy. If air escapes from the mouth or nose when ventilating, seal the mouth and pinch the nostrils.
 - (3) Facial injuries create airway management difficulties due to bleeding and swelling.
 - (4) Obstructions (Refer to current AHA guidelines)
 - (5) Dental appliances
 - (a) Dentures - ordinarily dentures should be left in place
 - (b) Partial dentures (plates) may become dislodged during an emergency. Be prepared to remove if it becomes dislodged.
 - 4. Manually triggered ventilation device-typically not utilized due to the potential for gastric distention and possible lung damage
 - 5. Automatic Transport Ventilator/Resuscitator (ATV)
 - a. A manually triggered ventilation device that is attached to a control mechanism that allows ventilation variables, such as respiratory rate and tidal volume, to be set.
 - b. Is oxygen-powered
 - c. Use consumes 5 liters/minute of oxygen, whereas a BVM device uses 15-25 liters/minute
 - d. May require an external power source
 - e. Must have bag-valve-mask device available as back up
 - f. May interfere with timing of chest compressions
 - g. Monitor patient to assure full exhalation
 - h. Barotraumas is a common complication associated with use of manually triggered ventilation devices and ATVs
 - 6. Continuous Positive Airway Pressure (CPAP)-noninvasive means of providing ventilatory support for specific patients in respiratory distress (requires additional training)
- VIII. Normal Ventilation versus Positive Pressure Ventilation
- A. Air Movement
 - 1. Normal ventilation-negative intrathoracic pressure, air is drawn into lungs
 - 2. Positive pressure ventilation-forces air into the chest cavity from the environment (not based on pressure changes)
 - B. Blood Flow
 - 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. Positive pressure ventilation may cause
 - a. Hypotension
 - b. Gastric distention
 - c. Other-pneumothorax, vomiting

MODULE 3

Basic Airway

Lesson 3-2

Practical Lab: Basic Airway Management

OBJECTIVES

OBJECTIVES LEGEND

C=Cognitive P=Psychomotor A=Affective

1 = Knowledge level

2 = Application level

3 = Problem-solving level

COGNITIVE OBJECTIVES

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

Demonstrate the cognitive objectives of Lesson 3-1: Airway Management, Respiration, & Artificial Ventilation.

AFFECTIVE OBJECTIVES

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

Demonstrate the affective objectives of Lesson 3-1: Airway Management, Respiration, & Artificial Ventilation.

PSYCHOMOTOR OBJECTIVES

Demonstrate the psychomotor objectives of Lesson 3-1: Airway Management, Respiration, & Artificial Ventilation.

MODULE 3

Airway Management, Respiration, and Artificial Ventilation

Advanced Airways

Lesson 3-3

Advanced Airways and Practical Lab

OBJECTIVES

OBJECTIVES LEGEND

C=Cognitive P=Psychomotor A=Affective

1 = Knowledge level

2 = Application level

3 = Problem-solving level

COGNITIVE OBJECTIVES

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

- 3-3.1 Explain the proper use of advanced non-visualized airways. (C-1)
- 3-3.2 List the indications for use of the advanced non-visualized airways. (C-1)
- 3-3.3 List the contraindications for the use of the advanced non-visualized airways. (C-1)

AFFECTIVE OBJECTIVES

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

- 3-3.4 Appreciate the need to ensure airway patency by utilizing an advanced non-visualized airway. (A-1)
- 3-3.5 Value the importance of positive pressure (assisted) ventilations while using an advanced non-visualized airway. (A-2)
- 3-3.6 Appreciate the importance of confirming placement after having inserted an advanced non-visualized airway. (A-1)

PSYCHOMOTOR OBJECTIVES

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

- 3-3.7 Demonstrate the sequence of steps involved in inserting an advanced non-visualized airway. (P-2)
- 3-3.8 Demonstrate the sequence involved in confirming placement of an advanced non-visualized airway by auscultating for lung and epigastric sounds.
- 3-3.9 Analyzes the anatomical location of an advanced non-visualized airway after placement and evaluation of lung and epigastric sounds. (P-3)
- 3-3.10 Problem solves difficulties encountered due to improper placement of an advanced non-visualized airway. (P-3)

PRESENTATION

Declarative (What)

- I. Advantages of an advanced non-visualized airways (Combitube® and King LTS-D®)
 - A. Insertion does not require visualization of the vocal cords
 - B. Proper placement into either the esophagus (Combitube® or King LTS-D®) or trachea (Combitube® only) for dual lumen airways

- C. Increased tidal volume by decreasing dead space
- D. Provides protection from aspiration
- II. Indications for use of an advanced non-visualized airways
 - A. Cardiac arrest
 - B. Unresponsive patient with inadequate respirations and absent gag reflex
- III. Select appropriate size advanced non-visualized airways (refer to manufacturers recommendation on indications and contraindications for use for specific airways)
- IV. Contraindications for use of the advanced non-visualized airways
 - A. Patient's height (refer to manufacturer's recommendations)
 - B. Presence of an active gag reflex
 - C. Caustic substance ingestion
 - D. Known history of esophageal disease
 - E. Patient with tracheostomy or laryngectomy
 - F. Foreign body in trachea
- V. Insertion of an advanced non-visualized airway and inflation of cuffs
 - A. Adhere to manufacturer's recommendations and Wisconsin Standards and Procedures of Practical Skills Manual
- VI. Ventilate the patient
 - A. Confirm placement by observing chest rise and fall and auscultating for lung and epigastric sounds
 - B. Continue to ventilate while monitoring patient

MODULE 3

Basic and Advanced Airway Management

Lesson 3-4

Evaluation: Basic and Advanced Airway Management

OBJECTIVES

OBJECTIVES LEGEND

C=Cognitive P=Psychomotor A=Affective

1 = Knowledge level

2 = Application level

3 = Problem-solving level

COGNITIVE OBJECTIVES

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

Demonstrate knowledge of the cognitive objectives of Lesson 3-1 – 3-3.

AFFECTIVE OBJECTIVES

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

Demonstrate knowledge of the affective objectives of Lesson 3-1 – 3-3.

PSYCHOMOTOR OBJECTIVES

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

Demonstrate proficiency in the psychomotor objectives of Lesson 3-1 – 3-3.

MODULE 4

Overview of Shock

Lesson 4-1

Overview of Shock

OBJECTIVES

OBJECTIVES LEGEND

C=Cognitive P=Psychomotor A=Affective

1 = Knowledge level

2 = Application level

3 = Problem-solving level

COGNITIVE OBJECTIVES

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

- 4-1.1 Define shock (hypoperfusion). (C-1)
- 4-1.2 Discuss components for normal perfusion. (C-3)
- 4-1.3 List causes of shock. (C-1)
- 4-1.4 List the three stages (categories) of shock and differentiate between signs and symptoms of the three stages (C-2)
- 4-1.5 Identify the compensatory mechanisms related to shock. (C-1)
- 4-1.6 List various types of shock. (C-1)
- 4-1.7 Differentiate between causes, signs and symptoms of the various types of shock. (C-2)
- 4-1.8 Explain appropriate care for patients exhibiting signs and symptoms associated with each type of shock. (C-2)
- 4-1.9 Discuss general assessment components of adult and pediatric patients. (C-3)
- 4-1.10 Analyze the need for expedient care and transport of shock patients. (C-3)
- 4-1.11 Describe age-related variations when assessing and treating a pediatric and/or geriatric patient in shock (C-2)

AFFECTIVE OBJECTIVES

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

- 4-1.12 Explain the sense of urgency to transport patients that are bleeding and show signs of shock. (A-1)
- 4-1.13 Explain the rationale for having knowledge and skills appropriate for dealing with pediatric and geriatric patients in shock. (A-1)

PSYCHOMOTOR OBJECTIVES

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

- 4-1.14 Problem-solve how to appropriately provide emergency care for a patient exhibiting signs and symptoms of shock. (P-3)

PRESENTATION

Declarative (What)

- I. Shock (hypoperfusion)
 - A. Introduction

1. Perfusion - the passage of blood and oxygen and other essential nutrients to the body's cells
 2. While delivering these essentials to the body's cells, the circulatory system is also removing waste such as carbon dioxide from the cells
 3. Shock - a state of hypoperfusion, or inadequate perfusion of blood through body tissues and inadequate removal of metabolic waste products
 - a. Cell hypoxia related to oxygen transport disturbance
 - b. Hypercarbia related to carbon dioxide transport disturbance
 4. Hypoperfusion can lead to death if not corrected
 5. Peripheral perfusion is drastically reduced due to the reduction in circulating blood volume
 6. Prompt recognition and treatment is vital to patient survival
- B. Essential components for normal perfusion (review)**
1. Functioning pump/heart
 - a. Pump delivers blood to the tissue
 - b. Pump collects blood from the body
 - c. Controlled by the autonomic nervous system during shock
 2. Adequate volume
 - a. Blood contains formed elements
 - (1) RBCs
 - (2) WBCs
 - (3) Platelets
 - b. Plasma
 3. Intact container/vessels
 - a. Arteries – high pressure vessels surrounded by smooth muscle contract and dilate to deliver blood to tissue
 - b. Capillary beds - where perfusion occurs
 - c. Veins - low pressure vessels responsible for returning blood to the heart
 - d. Smooth muscle and sphincters are controlled by the autonomic nervous system to constrict or dilate
- C. Causes of shock (disruptions)**
1. Pump failure
 - a. Disease or injury to conduction system
 - b. Damage to cardiac muscle
 2. Vessel failure (leaky or dilated container/vessels)
 - a. Loss of nervous control
 - b. Severe allergic reactions
 - c. Massive infection
 - d. Hypothermia
 3. Fluid (volume) loss
 - a. Blood loss
 - b. Water loss

- D. **Stages/categories of shock (presentation may differ based on type of shock)**
1. **Compensated-early stage**
 - a. Altered LOC-anxiety, restlessness, combative
 - b. Feeling of impending doom
 - c. Normal blood pressure
 - d. Increased, weak pulse
 - e. Increased, shallow respirations
 - f. Pale, cool, clammy skin
 - g. Thirst
 - h. Nausea and vomiting
 - i. **Normal pupils**
 2. **Decompensated-late stage**
 - a. Diminishing LOC, to unresponsiveness
 - b. Dropping blood pressure (late sign)
 - c. Rapid, weak pulse (peripheral pulses may be absent)
 - d. Shallow, labored respirations
 - e. Extreme weakness
 - f. Cyanosis
 - g. Dilated pupils
 3. **Irreversible-terminal stage**
 - a. Unresponsiveness
 - b. **Profound hypotension**
 - c. **Bradycardia leading to pulselessness**
 - d. Apnea
 - e. **Pupils fixed and dilated**
- II. **Compensatory mechanisms related to shock**
- A. **Sympathetic NS (flight or fight response) - activation causes**
1. Releases epinephrine and norepinephrine
 2. Increased pulse (due to vasoconstriction)
 3. Maintains blood pressure (due to vasoconstriction)
 4. Increased respirations (aid is combating hypoxia)
- III. **Types of Shock**
- A. **Fluid Loss**
1. **Hypovolemic – fluid loss**
 - a. **Examples – vomiting and diarrhea; burns**
 - b. **Signs and symptoms (refer to Stages/categories of Shock)**
 2. **Hemorrhagic – blood loss**
 - a. **Examples – bleeding (internal and/or external)**
 - b. **Signs and symptoms (refer to Stages/categories of Shock)**
 - c. **Patient Care**
 - (1) **Consider manual c-spine stabilization**
 - (2) **Airway/breathing management**
 - (3) **Oxygen administration (high-flow/high-concentration)**
 - (4) **Control bleeding**
 - (5) **Position patient appropriately**

- (6) Maintain body temperature
 - (7) Consider pneumatic anti-shock garment (PASG)
 - (8) Do not give food or drink (NPO)
 - (9) Expedite transport, consider ALS
 - (10) Treat non-life-threatening injuries en route
- B. Pump Failure
- 1. Cardiogenic – inadequate pumping action of the heart
 - a. Examples – congestive heart failure (CHF), acute myocardial infarction (AMI)
 - b. Signs and symptoms
 - (1) Pale or ashen, cool, clammy skin
 - (2) Cyanosis
 - (3) Rapid, weak pulse
 - (4) Rapid, shallow breathing/shortness of breath; wet breath sounds
 - (5) Restlessness, anxiety
 - (6) Altered LOC
 - (7) Nausea and vomiting
 - (8) Low or decreasing blood pressure
 - (9) Chest pain possible
 - (10) Fatigue
 - (11) Diaphoresis (acute onset of profuse sweating)
 - (12) Feeling of impending doom
 - (13) Denial
 - c. Patient Care
 - (1) Monitor ABCs
 - (2) Oxygen administration
 - (3) Aspirin per protocol
 - (4) Assisted nitroglycerin per protocol
 - (5) CPR and AED if patient unresponsive and pulseless
 - (6) Expedite transport/consider ALS
- C. Container Failure
- 1. Anaphylaxis –severe allergic reaction
 - a. Causes – insect bites/stings, medications, foods
 - b. Signs and symptoms
 - (1) Difficulty breathing
 - (2) Dyspnea
 - (3) Hives, urticaria, wheals
 - (4) Hypotension
 - (5) Stridor
 - (6) Hoarseness
 - (7) Wheezing
 - (8) Swelling
 - c. Patient Care
 - (1) Airway management
 - (2) Oxygen administration

- (3) Maintain body temperature
 - (4) Position patient appropriately
 - (5) Epinephrine per protocol
 - (6) Albuterol per protocol
 - (7) Expedite transport/consider ALS
2. Neurogenic (spinal shock) - loss of sympathetic vascular tone resulting in massive vasodilation
 - a. Example – spinal cord injury
 - b. Signs and symptoms
 - (1) Inability to breath adequately (diaphragmatic breathing)
 - (2) Increased respiratory rate
 - (3) Decreased blood pressure
 - (4) Warm skin
 - (5) Absence of sweating below level of cord injury
 - (6) Numbness or loss of sensation (plegia)
 - (7) Paralysis
 - (8) Priapism
 - c. Patient Care
 - (1) Monitor ABCs
 - (2) Support respiratory effort
 - (3) Oxygen administration
 - (4) Spinal immobilization
 - (5) Body temperature maintenance
 - (6) Expedite transport/consider ALS
3. Sepsis - loss of vascular volume and tone resulting from a bacterial infection, causing inability of cells to utilize oxygen and glucose
 - a. Causes – serious illness, injury or surgery
 - b. Signs and Symptoms
 - (1) Altered LOC
 - (2) Increased pulse rate
 - (3) Increased respiratory rate
 - (4) Dropping blood pressure
 - (5) Fever, chills, sweating
 - c. Patient care
 - (1) Monitor ABCs
 - (2) Oxygen administration
 - (3) Expedite transport/consider ALS
4. Psychogenic - syncopal episode (fainting) – a self-correcting, temporary episode of unresponsiveness
 - a. Causes - excessive grief, joy, fear, medication imbalance, orthostatic drop
 - b. Signs and symptoms
 - (1) Sudden loss of consciousness
 - (2) Rapid drop in blood pressure
 - (3) Pale, cool skin

- c. Patient care
 - (1) Monitor ABCs
 - (2) Airway management
 - (3) Oxygen administration
 - (4) Position patient appropriately
 - (5) Check for and manage associated injuries due to possible fall
 - (6) Check blood glucose level
 - (7) Evaluate for underlying causes
 - (8) Consider need for transport
- 5. Metabolic – caused by an imbalance between production and elimination of acids, resulting in fluid imbalance and weakened vessel
 - a. Examples – Diabetic emergencies, dialysis patient
 - b. Signs and symptoms
 - (1) Altered LOC
 - (2) Increased pulse
 - (3) Increased respirations; snoring respirations
 - (4) Varied to normal blood pressure
 - (5) Dizziness, weakness
 - c. Patient care
 - (1) Monitor ABCs
 - (2) Airway management
 - (3) Oxygen administration
 - (4) Check blood glucose level
 - (5) Maintain normal body temperature
 - (6) Expedite transport/consider ALS
- IV. Patient Assessment
 - A. Complete a scene size-up
 - B. Perform a primary assessment
 - C. Obtains a relevant history
 - D. Perform a secondary assessment
 - E. Perform a reassessment
- V. Age-related variations
 - A. Pediatrics
 - 1. Common causes of shock
 - a. Trauma
 - b. Fluid loss (diarrhea and dehydration)
 - c. Infection
 - d. Vomiting
 - e. Blood loss
 - f. Abdominal injuries
 - g. Congenital heart disease
 - h. Chest wall injury
 - 2. Less common causes of shock
 - a. Allergic reactions

- b. Poisoning
- c. Cardiac
- 3. Signs and symptoms
 - a. Weak or absent peripheral pulses
 - b. Delayed capillary refill
 - c. Rapid respiratory rate
 - d. Pale, cool, clammy skin
 - e. Mental status changes
 - f. Decreased urine output. Measured by asking parents about diaper wetting and look at diaper
 - g. Absence of tears, even when crying
 - h. Sunken fontanel (infant)
 - i. Tenting of skin
 - j. Infants and children can maintain normal blood pressure until their blood volume is more than half gone. By the time a drop in BP is seen, they are close to death. The infant or child in shock has less reserve.
- 4. Patient care
 - a. In-line spinal stabilization, if indicated
 - b. Suction as needed
 - c. High oxygen concentration
 - d. Control bleeding
 - e. Positioning
 - f. Maintain body temperature
 - g. Expedite transport/consider ALS
- B. Geriatrics
 - 1. Causes
 - a. All related forms of shock
 - 2. Signs and symptoms
 - a. Reference S/S associated with types of shock
 - b. Reference Special Populations Module on geriatrics
 - 3. Patient care
 - a. Reference treatments associated with types of shock

MODULE 4

Overview of Shock

Lesson 4-2

Evaluation: Overview of Shock

OBJECTIVES

OBJECTIVES LEGEND

C=Cognitive P=Psychomotor A=Affective

1 = Knowledge level

2 = Application level

3 = Problem-solving level

COGNITIVE OBJECTIVES

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

Demonstrate knowledge of the cognitive objectives of Lesson 4-1: Overview of Shock.

AFFECTIVE OBJECTIVES

No affective objectives.

PSYCHOMOTOR OBJECTIVES

No psychomotor objectives.

MODULE 5

Medical

Lesson 5-1

Medical Overview

OBJECTIVES

OBJECTIVES LEGEND

C=Cognitive P=Psychomotor A=Affective

1 = Knowledge level

2 = Application level

3 = Problem-solving level

COGNITIVE OBJECTIVES

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

5-1.1 Discuss various assessment factors. (C-1)

5-1.2 Identify the major components of a medical patient assessment. (C-1)

AFFECTIVE OBJECTIVES

No affective objectives identified.

PSYCHOMOTOR OBJECTIVES

No psychomotor objectives identified.

PRESENTATION

Declarative (What)

- I. Assessment factors
 - A. Scene safety
 - B. Environment
 - C. Chief complaint
 - 1. Primary reason for EMS response
 - 2. Verbal or non-verbal
 - 3. Possibly misleading
 - D. Life-threatening conditions
 - E. Non-life threatening conditions
 - F. Distracting injuries
 - G. Tunnel vision
 - H. Patient cooperation
 - I. EMT attitude
 - 1. Biases
 - 2. Labeling
- II. Major components of assessment
 - A. Standard precautions
 - B. Scene size-Up
 - C. General impression
 - D. Primary assessment
 - E. SAMPLE history mnemonic
 - 1. Obtain a thorough, but pertinent history

- a. Primary component of the overall assessment of the medical patient
 - b. Requires a balance of knowledge and skill to obtain a thorough and accurate history
 - c. Helps to ensure that proper care will be provided
2. Unresponsive patient
 - a. Pill containers
 - b. Medical identification
 - c. Family members
 - d. Bystanders
 - e. Medical devices
 3. Responsive patient
 - a. Obtained directly from the patient
 - b. Focused on the patient's chief complaint
 - c. Additional history may be obtained from evidence at the scene
 4. OPQRST mnemonic for evaluation of pain
 - a. O – onset; focuses on what the patient was doing when the problem began (question: what were you doing when the problem began?)
 - b. P – provoke; focuses on what might provoke the problem for the patient (question: does anything you do make the problem better or worse?)
 - c. Q – quality; focuses on the patient's own description of the problem (question: can you describe your pain/discomfort?)
 - d. R - region/radiate; focuses on the specific area(s) of the pain/discomfort (questions: Can you point to where you feel the pain/discomfort the most? Does the pain/discomfort radiate to any other areas of your body?)
 - e. S – severity; focuses on the intensity of the pain/discomfort (question: on a scale from 0-10, 10 being the worst, where would you rate your pain?)
 - f. T – time; focuses on the duration of the problem/pain/discomfort (question: when did your problem/pain/discomfort first begin?)
- F. Baseline vital signs
- G. Secondary assessment
 1. May not be appropriate to perform a complete secondary assessment on all medical patients
 2. Designed to identify any signs or symptoms of illness that may not have been revealed during the primary assessment
- H. Continued assessment
 1. When practical, transport the patient in the recovery position to help ensure a patent airway
 2. Consider the need for ALS backup

MODULE 5

Medical

Lesson 5-2

Pharmacology and Medication Administration

OBJECTIVES

OBJECTIVES LEGEND

C=Cognitive P=Psychomotor A=Affective

1 = Knowledge level

2 = Application level

3 = Problem-solving level

COGNITIVE OBJECTIVES

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

- 5-2.1 **Discuss medication safety. (C-1)**
- 5-2.2 Identify which medications are carried on board an ambulance licensed at the EMT level in Wisconsin. (C-1)
- 5-2.3 Identify the medications with which the EMT may assist the patient with administration at the EMT level in Wisconsin. (C-1)
- 5-2.4 List the components of a drug profile. (C-1)
- 5-2.5 Identify the different forms in which medications are found. (C-1)
- 5-2.6 State the importance of determining the preexistence of a medication allergy and describe how allergies to medications can affect patients. (C-1)
- 5-2.7 Explain the importance of medical control involvement and medication administration. (C-1)
- 5-2.8 Summarize the "6 R's" in the administration of a medication. ((C-1)
- 5-2.9 Differentiate between what is meant by a medication allergy versus medication intolerance. (C-2)
- 5-2.10 State the rationale for administering most medications to pediatric patients based upon weight. (C-1)
- 5-2.11 Define the concept of polypharmacy as it relates to geriatric patients. (C-1)

AFFECTIVE OBJECTIVES

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

- 5-2.12 Examine the importance of correctly administering medications to specific patients. (C-3)

PSYCHOMOTOR OBJECTIVES

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

- 5-2.13 Demonstrate general steps for assisting patient with self-administration of medications. (P-2)
- 5-2.14 Demonstrate general steps involved in administering a medication to a patient. (P-2)
- 5-2.15 Read the labels and inspect each type of medication that can be administered by the EMT. (P-2)
- 5-2.16 Create a drug profile for each of the medications that can be administered by the EMT. (P-1)

PRESENTATION

Declarative (What)

- I. Medication safety - the importance of medications and the concerns associated with their administration
- II. Medications authorized and based upon current Wisconsin EMT Scope of Practice (may require additional training and State EMS office/service medical director approval)
 - A. Activated Charcoal
 - B. Oral Glucose
 - C. Glucagon
 - D. Oxygen
 - E. Albuterol, nebulized
 - F. Atrovent, nebulized
 - G. Aspirin
 - H. Epinephrine
 - I. MARK 1 Kit (Atropine and 2-PAM Chloride)
- III. Medications that are prescribed by a physician and the patient has in his/her possession. May assist patients, with approval by medical control.
 - A. Metered Dose Inhalers – Albuterol, Atrovent
 - B. Nitroglycerin
 - C. Epinephrine, auto-injector
- IV. Drug Profile - information about medications that every EMT should be aware of prior to administering any medication
 - A. Medication names
 1. Generic
 - a. The name listed in the U.S. Pharmacopedia, a governmental publication listing all drugs in the U.S
 - b. Name assigned to drug before it becomes officially listed. Usually a simple form of the chemical name.
 - c. Not capitalized
 - d. Examples include activated charcoal, albuterol, aspirin, glucose, epinephrine
 2. Trade
 - a. Brand name is the name a manufacturer uses in marketing the drug
 - b. Capitalized
 - c. Examples include Super Char, Proventil, Bayer, Insta-glucose, Epi-pen Auto-injector
 - B. Mechanism of action - the desired effect that a particular medication has upon body systems and their function.
 1. Pharmacodynamics - impact of age and weight upon medication
 2. Indications
 3. Intended effects (desired)
 - C. Indications - the indication for a drug's use includes the most common uses of the drug in treating a specific illness

- D. Contraindications - situations in which a drug should not be used because it may cause harm to the patient or offer no effect in improving the patient's condition or illness
- E. Medication Form
 - 1. Types:
 - a. Compressed powders or tablets - nitroglycerin
 - b. Liquids for injection – epinephrine and glucagon
 - c. Gels – glucose
 - d. Suspensions - activated charcoal
 - e. Fine powder for inhalation – metered-dose inhaler
 - f. Gases - oxygen
 - g. Sublingual spray - nitroglycerin
 - h. Liquid/vaporized nebulizers – albuterol and Atrovent
 - i. Each drug is in a specific medication form to allow properly controlled concentrations of the drug to enter into the blood stream where it has an effect on the target body system
- F. Side effects – action of a drug other than those desired
 - 1. **Unintended effects – consequences associated with use (e.g. headache, nausea and vomiting)**
 - 2. **Untoward effects – consequence associated with use that is potentially harmful (e.g. hypotension)**
 - 3. Intolerance - the severity of side effects may outweigh expected benefits of the medication
- G. Dose - how much of the drug should be given
- H. Routes of medication administration
 - 1. **Enteral (ingested)**
 - a. Oral – swallowed
 - b. Sublingual - absorbed through mucous membranes
 - 2. **Parenteral (injected and inhaled)**
 - a. **Inhaled**
 - b. **Injection**
 - (1) Intramuscular injection - injected into muscle
 - (2) Subcutaneous injection - injected into subcutaneous tissue
 - (3) Intravenous - administered into veins (not an EMT skill)
 - (4) **Intraosseous Infusion – administered into bone marrow (not an EMT skill)**
 - 3. Endotracheal - administered into an ET tube (not an EMT skill)
- V. Allergies
 - A. Can occur with medication administration if patient is hypersensitive to that medication
 - B. If severe, may cause swelling of airway tissues
 - C. Be alert for signs and symptoms of severe allergic reaction
 - D. Identify preexisting allergies during patient history to avoid potentially adverse or fatal response to medications

- VI. Involve medical control in medication administration
 - A. Adequate consideration of indications and contraindications
 - B. Adequate consideration of potential medication interaction
 - C. Possible adjustment of usual dose based on age, weight and relative contraindications
- VII. The “6 Rs” of medication administration
 - A. Right patient
 - B. Right drug
 - C. Right dose
 - D. Right time
 - E. Right route
 - F. Right documentation
- VIII. **Assessment and re-assessment**
 - A. **Data – indications for medication**
 - B. **Action – medication administration**
 - C. **Response – effect of medication**
 - D. Documentation
- IX. Weight-based administration of medications for pediatrics
 - A. Safe dosing
 - B. 1 kg = 2.2 lbs
 - C. Predetermined dose – eg. Epi-Pen Jr
- X. Polypharmacy and the geriatric patient
 - A. Drug interactions
 - B. Serious side effects
 - C. Sensitivity to normal dose
 - D. Provide relevant examples

MODULE 5

Medical

Lesson 5-3

**Respiratory
Emergencies**

OBJECTIVES

OBJECTIVES LEGEND

C=Cognitive P=Psychomotor A=Affective

1 = Knowledge level

2 = Application level

3 = Problem-solving level

COGNITIVE OBJECTIVES

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

- 5-3.1 **Review anatomy, physiology and pathophysiology of the respiratory system. (C-1)**
- 5-3.2 **List common assessment findings and symptoms related to respiratory conditions. (C-1)**
- 5-3.3 Differentiate between upper airway obstruction and a lower airway disease in the adult patient. (C-3)
- 5-3.4 Differentiate between upper airway obstruction and airway diseases in the pediatric patient. (C-3)
- 5-3.5 Identify common respiratory diseases of the adult patient. (C-1)
- 5-3.6 Identify common respiratory diseases of the pediatric patient. (C-1)
- 5-3.7 **Identify common respiratory diseases of the geriatric patient. (C-1)**
- 5-3.8 Recognize the need for medical direction to assist in the emergency medical care of the patient with breathing difficulty. (C-3)
- 5-3.9 Establish the relationship between airway management and the patient with breathing difficulty. (C-3)
- 5-3.10 Identify appropriate treatment and management for the adult patient in respiratory distress due to a common respiratory disease. (C-1)
- 5-3.11 Identify appropriate treatment and management for the pediatric patient in respiratory distress due to a common respiratory disease. (C-1)
- 5-3.12 Develop a drug profile for albuterol. (C-1)
- 5-3.13 Develop a drug profile for ipratropium bromide (Atrovent). (C-1)
- 5-3.14 Distinguish between the emergency medical care of the infant, child and adult patient with signs of respiratory distress. (C-3)

AFFECTIVE OBJECTIVES

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

- 5-3.15 Defend EMT treatment regimens for various respiratory emergencies. (A-1)
- 5-3.16 Explain the rationale for administering albuterol. (A-3)
- 5-3.17 Explain the rationale for administering Atrovent. (A-3)

PSYCHOMOTOR OBJECTIVES

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

- 5-3.18 Demonstrate the emergency medical care for a patient in respiratory distress. (P-2)

- 5-3.19 Perform the steps in assisting a patient with the use of their metered dose inhaler. (P-2)
- 5-3.20 Perform the steps in administering a nebulizer treatment, via hand-held and mask, to a patient in respiratory distress. (P-2)
- 5-3.21 Create a management plan to properly evaluate and treat an adult patient in respiratory distress. (P-3)
- 5-3.22 Create a management plan to properly evaluate and treat a pediatric patient in respiratory distress. (P-3)

PRESENTATION

Declarative (What)

- I. Anatomy, **physiology and pathophysiology review (reference Preparatory and Airway Modules)**
 - A. Respiratory Anatomy
 - 1. Upper Airway Structures and Function
 - 2. Lower Airway Structures and Function
 - 3. Lungs and Accessory Structures
 - 4. Infant and child anatomy considerations
 - a. Mouth and nose - structures smaller and more easily obstructed
 - b. Pharynx - tongues take up proportionally more space
 - c. Trachea - narrow tracheas obstruct more easily by swelling, trachea softer, more flexible
 - d. Cricoid cartilage - less developed, less rigid
 - e. Diaphragm - chest wall softer, greater dependence on diaphragm for breathing
 - B. **Respiratory physiology (review/reference Preparatory and Airway Modules)**
 - 1. **Alveolar/capillary exchange**
 - 2. **Capillary/cellular exchange**
 - 3. **Normal respiratory effort**
 - C. **Respiratory pathophysiology and respiratory compromise (review/reference Preparatory and Airway Modules)**
 - 1. **Constrictive, obstructive, destructive**
 - 2. **Mechanical ventilation impairment (inadequate breathing)**
- II. **Assessment findings and symptoms for respiratory conditions**
 - A. Signs and symptoms
 - 1. Shortness of breath
 - 2. Restlessness
 - 3. Increased pulse rate
 - 4. **Changes in respiratory rate and rhythm**
 - 5. Skin color changes
 - a. Cyanotic (blue-gray)
 - b. Pale
 - c. Flushed (red)

6. Noisy breathing (abnormal sounds of breathing)
 - a. Crowing-upper airway compromise
 - b. Audible wheezing-lower airway compromise
 - c. Gurgling-upper airway compromise
 - d. Snoring-upper airway compromise
 - e. Stridor-upper airway compromise
 - (1) A harsh sound heard during breathing
 - (2) Upper airway obstruction
 7. Inability to speak due to breathing efforts
 8. Retractions
 9. Use of accessory muscles
 10. Shallow or slow breathing may lead to altered mental status (with fatigue or obstruction)
 11. Abdominal breathing (diaphragm only)
 12. Coughing
 13. Patient position
 - a. Tripod position
 - b. Sitting with feet dangling, leaning forward
 14. Unusual anatomy (barrel chest)
 15. Nasal flaring
 16. Pursed-lip breathing
- III. Common respiratory diseases – adults
- A. Reactive Airway Disease (RAD)
1. Asthma – (lower airway disease) occurs in acute episodes and is triggered by exposure to an irritant, resulting in inflammation and swelling of the airways, tightening of the muscles surrounding bronchi and bronchioles (bronchoconstriction) and production of mucus. Triggers include cold air, dust, strong fumes, exercise, inhaled irritants, emotional upsets and smoke.
 - a. Signs and symptoms
 - (1) Wheezing
 - (2) Coughing
 - (3) Shortness of breath
 - (4) Anxiety
 - (5) Chest tightness
 - (6) Silent chest
 - (7) Fever rarely present
 - (8) Tripod position
 - (9) Inability to speak full sentences
 - (10) Pursed-lip breathing
 - (11) Fatigue
 - b. Patient management/treatment
 - (1) Monitor ABCs
 - (2) Oxygen
 - (3) Position of comfort

- (4) Respiratory medication administration with approval from medical direction (albuterol, Atrovent, etc.)
 - (5) Transport, consider ALS
 2. Pneumonia – (lower airway disease) an inflammation of the lungs caused by bacteria or viral infection, usually triggered by a simple upper respiratory tract infection or flu; associated with fever, cough and excess production of sputum. Fluid accumulation separates alveoli from surrounding capillary beds, inhibiting gas exchange
 - a. Signs and symptoms
 - (1) Dyspnea
 - (2) Abnormal breath sounds
 - (3) Increased respiratory rate
 - (4) Increased pulse rate
 - (5) Fever, chills
 - (6) Low blood pressure
 - (7) Pale or cyanotic skin
 - (8) Altered LOC (advanced stage)
 - (9) Coughing up sputum
 - (10) Fatigue
 - b. Patient management/treatment
 - (1) Monitor ABCs
 - (2) Oxygen
 - (3) Transport, consider ALS
- B. Chronic Obstructive Pulmonary Disease (COPD) – (lower airway disease) chronic respiratory diseases that are characterized by obstruction to airflow that severely interferes with normal breathing and the gas exchange process. Chronic bronchitis and emphysema typically co-exist. Smoking, second-hand smoke, industrial pollutants and history of childhood respiratory infections are commonly attributed to the development of COPD.
 1. Chronic bronchitis – chronic inflammation and scarring of the lining of the bronchioles, associated with a heavy mucus build up that restricts gas exchange.
 - a. Signs and symptoms
 - (1) Shortness of breath
 - (2) Abnormal breath sounds
 - (3) Fatigue
 - (4) Coughing
 - (5) Fever possible
 - (6) Production of sputum
 - (7) Cyanosis
 - b. Patient management/treatment
 - (1) Monitor ABCs
 - (2) Oxygen
 - (3) Respiratory medications may be advised by medical direction

- (4) Transport, consider ALS
 2. Emphysema – chronic disease process resulting in the destruction of alveoli and loss of elasticity of the lungs, making adequate gas exchange difficult
 - a. Signs and symptoms
 - (1) Shortness of breath
 - (2) Barrel-shaped chest
 - (3) Thin appearance
 - (4) Wheezing
 - (5) Diminished breath sounds
 - (6) Fatigue
 - b. Patient management/treatment
 - (1) Monitor ABCs
 - (2) Oxygen
 - (3) Respiratory medications may be advised by medical direction
 - (4) Transport, consider ALS
 - C. Hyperventilation Syndrome – rapid, shallow breathing usually brought on by anxiety or emotional upset that result in an imbalance in normal levels of carbon dioxide.
 1. Signs and symptoms
 - a. Shortness of breath
 - b. Numbness and tingling around the mouth and hands
 - c. Lightheadedness
 - d. Spasms of the hand and feet
 - e. Fainting
 2. Patient management/treatment
 - a. Coach patient to slow breathing rate and relax
 - b. Attempt to determine the underlying cause because the hyperventilation may be the result of a serious problem
 - c. Transport, consider ALS
 - D. Pulmonary edema – A buildup of fluid in the lungs, usually as a result of congestive heart failure or a toxic inhalation
 1. Signs and symptoms
 - a. Shortness of breath
 - b. Wet breath sounds
 - c. Increased respiratory rate,
 - d. Coughing up pink, frothy sputum that may be blood tinged
 - e. Severe dyspnea
 - f. Wheezing
 - g. Feeling of suffocating
 - h. Anxiety
 - i. Pale skin
 - j. Diaphoresis (excessive sweating)
 - k. Patient usually sitting in upright position
 - l. Orthopnea (positional shortness of breath)

2. Patient management/treatment
 - a. Administer high flow oxygen]
 - b. Provide ventilator support
 - c. Suction as needed
 - d. Patient transported in position of comfort (may benefit from having legs/feet in dependent position)
 - e. CPAP (optional with additional training and authorization by State EMS office/service medical director)
 - f. Prompt transport, consider ALS
- E. Spontaneous pneumothorax – a potentially life-threatening accumulation of air in the pleural space (partial or complete), which is caused by a rupture of a small sac (bleb) on the surface of the lung and occurs in the absence of traumatic injury. This condition causes the lung to collapse.
 1. Signs and symptoms
 - a. Shortness of breath – may be severe
 - b. Increased respiratory rate
 - c. Diminished or absent breath sounds
 - d. Pleuritic chest pain possible
 - e. Cyanosis in severe cases
 2. Patient management/ treatment
 - a. Place patient in position of comfort
 - b. Administer high flow oxygen
 - c. Support ABCs – be prepared to assist ventilations
 - d. Prompt transport, consider ALS
 - e. CPAP contraindicated
- F. Pulmonary embolism – occurs when a clot migrates to a vessel in the lung, causing obstruction of blood flow, resulting in a ventilation-perfusion mismatch; gas exchange is not able to take place and hypoxia occurs.
 1. Signs and symptoms
 - a. Shortness of breath
 - b. Anxiety
 - c. Rapid respirations
 - d. Possible chest pain
 - e. Tachycardia possible
 - f. Possible hemoptysis (coughing up blood)
 - g. Difficulty breathing
 - h. Cyanosis
 - i. Look for risk factors (recent orthopedic surgery, patient on birth control, sedentary, recent hospitalization)
 2. Patient management/treatment
 - a. Administer supplemental oxygen
 - b. Maintain airway patency and provide ventilatory support
 - c. Rapid transport, consider ALS
- G. Environmental/industrial exposure/toxic gases – most commonly caused by inhalation of a toxic chemical.
 1. Signs and symptoms - vary with exposure

- a. **Dyspnea**
 - b. **Chest tightness**
 - c. **Anxiety**
 - d. **Dysrhythmia (irregular heart rhythm, tachycardia, bradycardia)**
 - e. **Itchy, watery eyes; mucous membrane irritation**
 - f. **Sore throat; cough; hoarseness; stridor**
 - g. **Altered mental status**
 2. **Patient management/treatment**
 - a. **Scene safety - consider HazMat team with proper equipment**
 - b. **Decontaminate prior to treatment**
 - c. **Airway management; oxygen therapy**
- IV. **Age related respiratory diseases, variations, assessment and management**
- A. **Pediatric**
1. **Airway obstruction (i.e. foreign body aspiration or tracheostomy)**
 2. **Asthma - bronchioles spasm and constrict, swelling bronchial membrane, reducing airway size, and producing mucus (see previous discussion on asthma)**
 3. **Croup - viral infection that results in swelling and inflammation of the lining of the upper airways, occurring mostly in winter months**
 - a. **Signs and symptoms (occurring mostly at night or when the child is upset or crying)**
 - (1) **Loud cough, sounding like a seal's bark**
 - (2) **Difficulty breathing**
 - (3) **Grunting**
 - (4) **Wheezing**
 - (5) **Cold-like symptoms**
 - (6) **Stridor**
 - (7) **Pale and/or cyanotic**
 - (8) **Retractions**
 - (9) **Nasal flaring**
 - b. **Patient management/treatment**
 - (1) **Monitor ABCs**
 - (2) **Oxygen, blow-by**
 - (3) **Position of comfort**
 - (4) **Transport, consider ALS**
 4. **Epiglottitis - condition that resembles croup, caused by bacterial infection that inflames and swells the epiglottis, closing off air passage; a true medical emergency that may result in death if not treated rapidly; typically occurs in children ages 2-4 (can occur in adults)**
 - a. **Signs and symptoms**
 - (1) **Fever, high and sudden onset**
 - (2) **Sore throat**
 - (3) **Difficulty breathing**
 - (4) **Drooling**

- (5) Difficulty swallowing
 - (6) Stridor
 - (7) Hoarseness
 - (8) Chills
 - (9) Cyanosis
 - b. Patient management/treatment
 - (1) Gentle, calm, reassuring care
 - (2) Oxygen, blow-by
 - (3) Position of comfort (usually sitting on parent's lap)
 - (4) Rapid transport, consider ALS
5. Pertussis (whooping cough) - airborne bacterial infection that affects mostly children younger than 6 years; highly contagious through droplet infection
- a. Signs and symptoms
 - (1) Shortness of breath
 - (2) "Whoop" sound on inspiration (usually following a cough attack)
 - (3) Cold-like symptoms (runny nose and sneezing)
 - (4) Coughing attack – lasting greater than one minute
 - (5) Skin - red or purple
 - (6) Vomiting
 - (7) Lack of appetite
 - (8) Dehydration
 - (9) Thick secretions
 - b. Patient management/treatment
 - (1) Manage airway; oxygen therapy
 - (2) Monitor for dehydration
 - (3) Transport, consider ALS
6. Cystic Fibrosis (CF) – a genetic disorder that affects the lungs and digestive system. CF disrupts the normal function of the cells that make up the lining of the lungs, the digestive system, the reproductive system, and sweat glands of the skin.
- a. Signs and symptoms associated with respiratory function
 - (1) Shortness of breath
 - (2) Persistent cough
 - (3) Wheezing
 - (4) Thick, sticky mucus
 - b. Patient management/treatment
 - (1) Manage airway; oxygen therapy
 - (2) Monitor for dehydration
 - (3) Transport, consider ALS
7. Bronchiolitis – a viral illness that typically occurs with newborns and toddlers, often caused by a respiratory syncytial virus (RSV) that causes inflammation of the bronchioles; more common in winter and early spring
- a. Signs and symptoms

- (1) Shortness of breath
- (2) Runny, stuffy nose
- (3) Wheezing
- (4) Slight fever
- (5) Respiratory distress (nasal flaring, use of accessory muscles)
- (6) Cyanosis
- (7) Lethargy
- b. Patient management/treatment
 - (1) Manage airway; oxygen therapy (humidified if possible)
 - (2) Transport, consider ALS
8. Cardiac arrest - almost all result from airway obstruction or respiratory arrest; or traumatic injury
- B. Geriatrics—pneumonia and chronic conditions such as COPD
 1. Upper airway obstruction
 - a. Foreign body aspiration
 - b. Epiglottitis
 - c. Tracheostomy dysfunction
 2. Lower airway disease
 - a. Asthma
 - b. Bronchiolitis (rare)
 - c. Pneumonia
 - d. Foreign body lower airway obstruction
 - e. Pertussis (rare)
 - f. Cystic fibrosis (rare)
- V. Medications
 - A. Metered dose inhalers (MDI)
 1. Medication name (most commonly used)
 - a. Generic - albuterol, isoetharine, metaproteranol
 - b. Trade - Proventil, Ventolin, Bronkosol, Alupent
 2. Indications
 - a. Signs and symptoms of respiratory compromise
 - b. Has prescribed handheld inhaler
 - c. Authorized by medical control
 3. Contraindications
 - a. Inability of patient to use device
 - b. Inhaler is not prescribed for the patient
 - c. No permission from medical control
 - d. Maximum prescribed dose reached
 4. Medication form - handheld metered dose inhaler
 5. Dosage - number of inhalations based upon medical control or physician's order
 6. Administration - inhaled
 - a. Obtain order from medical control
 - b. Assure "6 rights"

- c. Check to see if the patient has already taken any doses
 - d. Assure the inhaler is at room temperature or warmer
 - e. Shake the inhaler vigorously several times
 - f. Remove oxygen non-rebreather mask from patient
 - g. Have the patient exhale deeply
 - h. Have the patient put his lips around the opening of the inhaler (use spacer if available)
 - i. Have the patient depress the handheld inhaler and inhale deeply
 - j. Instruct the patient to hold breath for as long as comfortable
 - k. Replace oxygen on patient
 - l. Allow patient to breathe a few times and repeat second dose per order
7. Action - beta agonist bronchodilator - dilates bronchioles reducing airway resistance
 8. Side effects
 - a. Increased pulse rate
 - b. Tremors
 - c. Nervousness
 9. Assessment and reassessment
 - a. Obtain vital signs
 - b. Breath sounds
 - c. Evaluate patient response to medication administration
 - d. Patient may deteriorate and need positive pressure ventilation
 10. Infant and child considerations
 - a. Retractions more commonly seen
 - b. Cyanosis is a late finding
 - c. Coughing may be present rather than wheezing
 11. Other MDI medications may be allowed as an assisted medication (e.g. Atrovent). Contact medical control.
- B. Hand-held and mask nebulizers (small volume nebulizers)
1. Medication names
 - a. Albuterol (generic); Proventil, Ventolin (trade names)
 - b. Ipratropium bromide (generic); Atrovent (trade name)
 2. Indications
 - a. Signs and symptoms of respiratory compromise
 - b. Authorization by medical control
 3. Contraindications
 - a. Inability of patient to use device
 - b. **Known allergy**
 - c. Adverse effects of administration – patients on beta-blockers may be advised against being administered albuterol
 - d. No permission from medical control
 4. Medication form - liquid for nebulizing
 5. Dosage –

- a. Albuterol - 2.5 mg/3ml
- b. Atrovent – 0.5mg/3ml
6. Route - inhaled
7. Administration-
 - a. Contact medical control
 - b. Report assessment findings, including a thorough history
 - c. Report prior interventions and use of inhaler or nebulizer
 - d. 6 R's of medication administration
 - e. Assemble nebulizer
 - f. Add pre-measured medication dosage to nebulizer
 - g. Remove oxygen supply from existing patient adjunct and connect to medication canister. Provide additional oxygen to patient via nasal cannula at 4-6 lpm
 - h. Adjust nebulizer flow rate to 6 lpm, and/or per local protocol unless otherwise advised by manufacturer
 - i. Instruct patient to place the mouthpiece in their mouth and to inhale slowly and deeply (if utilizing a mask nebulizer, place mask appropriately on patient's face)
 - j. Have patient attempt to hold their breath for 1-2 seconds before exhaling
 - k. Continue until canister is depleted
 - l. Monitor patient
 - m. Resume oxygen therapy
 - n. Document on prehospital care report
8. Action
 - a. Albuterol - beta agonist bronchodilator - dilates bronchioles, by relaxing surrounding smooth muscles; reduces airway resistance
 - b. Atrovent – anticholinergic agent - timed-release effect; works on the smaller sections of bronchioles to reduce airway resistance
9. Side effects
 - a. Increased pulse rate
 - b. Tremors
 - c. Nervousness
10. Assessment and reassessment
 - a. Obtain vital signs
 - b. Breath sounds
 - c. Evaluate patient response to medication administration
 - d. Patient may deteriorate and need positive pressure artificial ventilation
11. Document administration
12. Infant and child considerations
 - a. Retractions are common
 - b. Cyanosis, late finding
 - c. Coughing may be present rather than wheezing

MODULE 5

Medical

Lesson 5-4

**Cardiac
Emergencies**

OBJECTIVES

OBJECTIVES LEGEND

C=Cognitive P=Psychomotor A=Affective

1 = Knowledge level

2 = Application level

3 = Problem-solving level

COGNITIVE OBJECTIVES

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

- 5-4.1 Describe circulatory system anatomy and physiology. (C-1)
- 5-4.2 Discuss pathophysiology related to cardiac compromise. (C-1)
- 5-4.3 List generalized signs and symptoms of cardiac compromise. (C-1)
- 5-4.4 Discuss specific cardiac emergencies, including signs, symptoms, and management. (C-1)
- 5-4.5 Discuss assessment components specific to a patient with cardiac compromise. (C-1)
- 5-4.6 Discuss generalized management of cardiac compromise. (C-1)
- 5-4.7 Discuss cardiac resuscitation. (C-1)
- 5-4.8 Discuss the use of the AED for adult, child and infant. (C-1)
- 5-4.9 Identify special AED situations. (C-1)
- 5-4.10 Discuss cardiac medication administration by the EMT in caring for patients with cardiac compromise. (C-1)

AFFECTIVE OBJECTIVES

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

- 5-4.11 Defend the reasons for obtaining initial training in automated external defibrillation and the importance of continuing education. (A-3)
- 5-4.12 Explain the rationale for administering nitroglycerin to a patient with chest pain or discomfort. (A-3)

PSYCHOMOTOR OBJECTIVES

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

- 5-4.13 Demonstrate the assessment and emergency medical care of a patient experiencing chest pain/discomfort. (P-1,2)
- 5-4.14 Demonstrate the application and operation of the automated external defibrillator for an adult, child and infant. (P-1,2)
- 5-4.15 Perform the steps in administering aspirin for chest pain or discomfort. (P-2)
- 5-4.16 Demonstrate the assessment and documentation of patient response to aspirin. (P-1,2)
- 5-4.17 Perform the steps in facilitating the use of nitroglycerin for chest pain or discomfort. (P-2)

- 5-4.18 Demonstrate the assessment and documentation of patient response to nitroglycerin. (P-1,2)
- 5-4.19 Create a management plan to include evaluation and management for an adult patient experiencing cardiac compromise. (P-3)

PRESENTATION

Declarative (What)

- I. Circulatory system anatomy and physiology
 - A. Circulatory (cardiovascular)
 1. Heart
 - a. Structure/function
 - (1) Atrium
 - (a) Right - receives blood from the veins of the body and the heart and pumps oxygen-poor blood to the right ventricle
 - (b) Left - receives blood from the pulmonary veins (lungs) and pumps oxygen-rich blood to left ventricle
 - (2) Ventricle
 - (a) Right - pumps blood to the lungs
 - (b) Left - pumps blood to the body
 - (3) Valves prevent backflow of blood
 - b. Cardiac conductive system (automaticity)
 - (1) Heart is more than a muscle
 - (2) Specialized contractile and conductive tissue in the heart
 - (3) Electrical impulses
 - c. Autonomic system control
 - (1) Sympathetic – “fight or flight”
 - (2) Parasympathetic – “feed and breed”
 2. Arteries
 - a. Function - carry blood away from the heart to the rest of the body
 - b. Major Arteries
 - (1) Coronary arteries - vessels that supply the heart with blood
 - (2) Aorta
 - (a) Major artery originating from the heart and lying in front of the spine in the thoracic and abdominal cavities
 - (b) Divides at the level of the navel into the iliac arteries
 - (3) Pulmonary
 - (a) Artery originating at the right ventricle
 - (b) Carries oxygen-poor blood to the lungs

- (4) Carotid
 - (a) Major artery of the neck
 - (b) Supplies the head with blood
 - (c) Pulsations can be palpated on either side of the neck
 - (5) Femoral
 - (a) The major artery of the thigh
 - (b) Supplies the groin and the lower extremities with blood
 - (c) Pulsations can be palpated in the groin area
 - (6) Radial
 - (a) Major artery of the lower hand
 - (b) Pulsations can be palpated at the wrist thumb side
 - (7) Brachial
 - (a) An artery of the upper arm
 - (b) Pulsations can be palpated on the inside of the arm between the elbow and the shoulder
 - (c) Used when determining a blood pressure (BP) using a BP cuff and a stethoscope
 - (8) Posterior tibial - pulsations can be palpated on the posterior surface of the medial malleolus
 - (9) Dorsalis pedis
 - (a) An artery in the foot
 - (b) Pulsations can be palpated on the anterior surface of the foot
3. Arterioles - the smallest branches of an artery leading to the capillaries
 4. Capillaries
 - a. Tiny blood vessels that connect arterioles to venules
 - b. Found in all parts of the body
 - c. Allow for the exchange of nutrients and waste at the cellular level
 5. Venules - the smallest branches of the veins leading to the capillaries
 6. Veins
 - a. Function - vessels that carry blood back to the heart
 - b. Major veins
 - (1) Pulmonary vein - carries oxygen-rich blood from the lungs to the left atrium
 - (2) Vena Cava
 - (a) Superior
 - (b) Inferior
 - (c) Carries oxygen-poor blood back to the right atrium
 7. Blood composition

- a. Red blood cells
 - (1) Give the blood its color
 - (2) Carry oxygen to organs
 - (3) Carry carbon dioxide away from organs
 - b. White blood cells - part of the body's defense against infections
 - c. Plasma - fluid that carries the blood cells and nutrients
 - d. Platelets - essential for the formation of blood clots
8. Physiology
- a. Pulse
 - (1) Left ventricle contracts sending a wave of blood through the arteries
 - (2) Can be palpated anywhere an artery simultaneously passes near the skin surface and over a bone
 - (3) Peripheral
 - (a) Radial
 - (b) Brachial
 - (c) Posterior tibial
 - (d) Dorsalis pedis
 - (4) Central
 - (a) Carotid
 - (b) Femoral
 - b. Blood pressure (**cardiac cycle**)
 - (1) Systolic - the pressure exerted against the walls of the artery when the left ventricle contracts
 - (2) Diastolic - the pressure exerted against the walls of the artery when the left ventricle is at rest
9. Blood circulation through a double pump
- a. Respiratory system
 - (1) Deoxygenated blood to lungs
 - (2) Oxygenated blood back to heart
 - b. Body
10. Cardiac output
- a. Heart rate x blood volume ejected/beat
11. Perfusion
- a. Function of red blood cells in oxygen delivery
 - b. Factors governing adequate perfusion
 - (1) Rate
 - (2) Pump
 - (3) Volume
12. Oxygenation of tissues
- a. Delivery of oxygenated blood
 - b. Removal of tissue wastes
- II. Pathophysiology
- A. Cardiac compromise

1. Inadequate circulation of blood and/ or perfusion of vital processes or organs
 2. Atherosclerosis
 - a. Plaque buildup in lumen of artery
 - b. Obstruction of blood flow
 - c. Interference with dilation and constriction of vessel
 - d. Occlusion
 - e. Ischemia is a result of decreased blood flow
 3. Rate-related compromise
 4. Inadequate pumping
 5. Inappropriate circulating volume
 6. Risk factors-modifiable and unmodifiable
 7. Congenital defects
- III. Generalized signs and symptoms of cardiac compromise
- A. Squeezing, dull pressure, chest pain commonly radiating down the arms or to the jaw
 - B. Sudden onset of sweating (diaphoresis) (this in and of itself is a significant finding)
 - C. Difficulty breathing (dyspnea)
 - D. Rapid and shallow breathing
 - E. Restlessness, anxiety or irritability
 - F. Feeling of impending doom
 - G. Abnormal pulse rate (may be irregular, slow or rapid)
 - H. Palpitations
 - I. Headache
 - J. Fatigue
 - K. Abnormal blood pressure
 - L. Cool, clammy skin
 - M. Pale, ashen or cyanotic
 - N. Epigastric pain
 - O. Nausea and vomiting
 - P. Insomnia
 - Q. Atypical presentations occur among certain patients (e.g. females and diabetics)
- IV. Cardiac emergencies
- A. Acute Coronary Syndromes (ACS)
 1. Coronary artery disease (CAD)
 - a. Angina pectoris – chest pain that occurs when the heart muscle does not receive adequate amounts of oxygen to meet the demands of the heart muscle. Patients with past history of angina typically call EMS after self administration of nitroglycerin provides no relief of symptoms.
 - (1) Stable
 - (a) Specific signs and symptoms
 - (i) Pain induced by exertion/stress

- (ii) Usually resolves with rest and/or nitroglycerin administration
 - (iii) Symptoms typically subside in less than 15 minutes
 - (b) Management
 - (i) Rest
 - (ii) Oxygen
 - (iii) Nitroglycerin, assisted
 - (iv) Aspirin (ASA)
 - (v) Cardiac monitor if available
 - (vi) 12-lead if available
 - (vii) Transport
 - (2) Unstable
 - (a) Specific signs and symptoms
 - (i) Chest pain, unprovoked
 - (ii) Usually resolves with nitroglycerin administration
 - (b) Management
 - (i) Rest
 - (ii) Oxygen
 - (iii) Nitroglycerin, assisted
 - (iv) Aspirin (ASA)
 - (v) Cardiac monitor if available
 - (vi) 12-lead if available
 - (vii) Transport
- b. Acute Myocardial Infarction (AMI) – heart attack occurs when the heart muscle is without oxygen for an extended period of time (ischemia), resulting in permanent damage (necrosis)
 - (1) Specific signs and symptoms
 - (a) Chest pain typically not resolved by rest, oxygen or nitroglycerin
 - (b) Pain lasts greater than 15 minutes
 - (c) Nausea and vomiting likely
 - (d) Sudden onset of diaphoresis
 - (e) May result in sudden death
 - (2) Management
 - (a) Rest
 - (b) Oxygen
 - (i) Follow AHA guidelines
 - (ii) Maintain 95% SpO₂
 - (c) Nitroglycerin, assisted
 - (d) Aspirin (ASA)
 - (e) Cardiac monitor if available
 - (f) 12-lead if available
 - (g) Transport/consider ALS intercept

- c. **Aneurysm – dilation or ballooning of a weakened section of the aorta; this is a life-threatening condition**
 - (1) **Specific signs and symptoms**
 - (a) **Tearing/ripping sensation between shoulder blades**
 - (b) **Hypotension**
 - (2) **Management**
 - (a) **Rapid transport/consider ALS intercept**
 - (b) **Oxygen**
 - (c) **Obtain bilateral blood pressures**
 - (d) **Constant monitoring of vital signs**
- 2. **Congestive Heart Failure (CHF) – the inability of the heart to pump properly, resulting in an excessive back up of fluids in either the lungs, extremities, or both**
 - a. **Right side failure (fluids back up in extremities)**
 - (1) **Specific signs and symptoms**
 - (a) **Normal or elevated blood pressure**
 - (b) **Peripheral (pedal) edema**
 - (c) **Jugular vein distention (late sign)**
 - (d) **Dyspnea, progressive**
 - b. **Left side failure (fluids back up in lungs)**
 - (1) **Specific signs and symptoms**
 - (a) **Pulmonary edema**
 - (b) **Orthopnea**
 - (c) **Pink, frothy sputum**
 - (d) **Severe dyspnea**
 - (2) **Management**
 - (a) **Rest**
 - (b) **Oxygen**
 - (c) **Nitroglycerin (per protocol)**
 - (d) **Aspirin (ASA) (per protocol)**
 - (e) **Cardiac monitor if available**
 - (f) **12-lead if available**
 - (g) **Transport/consider ALS intercept**
 - (h) **Patient positioning -left side failure patients benefit from sitting upright**
 - (i) **CPAP per protocol**
- 3. **Cardiogenic shock - A state of profound depression of the vital processes of the body, due to cardiac insufficiency, resulting in inadequate circulation**
 - a. **Specific signs and symptoms**
 - (1) **Severe hypotension**
 - (2) **Pulmonary edema**
 - (3) **Altered LOC**
 - (4) **Typically no chest pain**
 - b. **Management**

- (1) Oxygen
 - (2) Positive pressure ventilation
 - (3) Careful patient positioning
 - (4) Transport/ALS intercept
- B. Hypertensive Urgency (AHA reference)
1. Systolic BP greater than 180 mmHg
 2. Diastolic BP greater than 110 mmHg
 3. Signs and symptoms
 - a. Strong, bounding pulse
 - b. Severe headache
 - c. Ringing in ears
 - d. Nausea/vomiting
 - e. Epistaxis
 4. Management
 - a. Transport/consider ALS
 - b. Position of comfort
- C. Cardiac arrest
1. Signs and symptoms
 - a. Apneic
 - b. Pulseless
 2. Management
 - a. Refer to current AHA guidelines and Management section below
- V. Assessment components specific to cardiac compromise
- A. Primary assessment – evaluation and early detection of cardiac compromise is critical to patient outcome
 - B. History taking – interview for past medical history pertaining to chief complaint
 - C. Reassessment – unstable patients must be continually reevaluated
- VI. Generalized management of cardiac compromise (refer to the current American Heart Association guidelines as well as management for specific diseases/conditions)
- A. Position patient based upon underlying assessment findings
 - B. Airway management
 1. Oxygen therapy
 2. Oxygen saturation evaluation
 - a. Evaluate on all patients with cardiac compromise
 - b. Pulse oximetry may be unreliable in cardiac arrest and/or toxic inhalation
 3. Ventilatory assist
 - a. BVM
 - b. CPAP
 - C. Circulatory
 1. Patients with pulse
 - a. Oxygen
 - b. Cardiac monitoring

- c. 12-lead if available
 - d. Calm, reassuring
 - e. Rapid transport/ALS consideration
 - 2. Patients without pulse
 - a. CPR
 - b. AED
 - 3. Mechanical CPR devices
 - a. Impedance Threshold Device (ITD)
 - b. Mechanical piston device
 - c. Load-Distributing Band (LDB) or Vest CPR
 - D. Pharmacological interventions (refer below)
 - 1. Aspirin
 - 2. Nitroglycerin
- VII. Resuscitation
 - A. System components to maximize survival
 - 1. Early access
 - 2. Early CPR
 - 3. Early defibrillation
 - 4. Early advanced care
 - 5. Post-cardiac arrest care
 - B. Basic cardiac life support (refer to the current American Heart Association Guidelines for adult, child and infant procedures)
 - 1. Airway control and ventilation
 - 2. Chest compressions
 - 3. Automated External Defibrillation (AED) (Refer to the current American Heart Association guidelines for adult, child and infant)
 - 4. Special AED situations
 - a. Pacemaker
 - b. Wet patients
 - c. Transdermal medication patches
- VIII. Cardiac medications
 - A. Aspirin
 - 1. Medication name
 - a. Generic - aspirin
 - b. Trade – Bayer, St. Joseph's
 - 2. Indications - must have all of the following criteria:
 - a. Exhibits signs and symptoms of chest pain
 - b. Has specific authorization by medical direction
 - 3. Contraindications
 - a. Stomach ulcers
 - b. Allergy (e.g. patients with aspirin-induced asthma)
 - c. Patient unable to protect own airway
 - d. Patient has already met maximum prescribed dose prior to EMT arrival
 - 4. Medication form – chewable tablet

5. Dosage – 162-324mg dose (2-4, 81mg), and authorized by medical direction
6. Administration
 - a. Obtain order from medical direction either on-line or off-line
 - b. Perform focused assessment for cardiac patient
 - c. Assess vital signs
 - d. Contact medical control if no standing orders
 - e. Assure right medication, right patient, right route, patient alert
 - f. Check expiration date of aspirin
 - g. Question patient on last dose administration, effects, and assures understanding of route of administration
 - h. Ask patient to chew, not swallow whole, tablets
 - i. Record activity and time
 - j. Perform reassessment and evaluate effect of medication
7. Actions
 - a. Anticoagulant (thrombolytic) “blood thinner”
 - b. Decreases workload of heart
 - c. Mild analgesic
8. Side effects
 - a. Stomach upset
9. Reassessment strategies
 - a. Monitor blood pressure
 - b. Seek medical direction before re-administering
 - c. Record reassessment findings
- B. Nitroglycerin
 1. Medication name
 - a. Generic - nitroglycerin
 - b. Trade – Nitrostat
 2. Indications - must have all of the following criteria:
 - a. Patient exhibits signs and symptoms associated with cardiac compromise (e.g. chest pain, pressure or discomfort)
 - b. Patient has physician prescribed nitroglycerin
 - c. EMT has authorization by medical direction
 3. Contraindications
 - a. History of hypotension
 - b. Blood pressure below 100 mmHg systolic
 - c. Head injury
 - d. Infants and children
 - e. Patient has already met maximum prescribed dose prior to EMT arrival
 4. Medication form - tablet, sub-lingual spray
 5. Dosage - one dose, repeat in 3-5 minutes if no relief, BP > 100, and authorized by medical direction up to a maximum of three doses
 6. Administration
 - a. Obtain order from medical direction either on-line or off-line

- b. Perform focused assessment for cardiac patient
 - c. Evaluate blood pressure - above 100 mmHg systolic
 - d. Contact medical control if no standing orders exist
 - e. Assure right medication, right patient, right route, patient alert
 - f. Check expiration date of nitroglycerin
 - g. Question patient on last dose administration, effects, and assures understanding of route of administration
 - h. Ask patient to lift tongue and place tablet or spray dose under tongue (while wearing gloves) or have patient place tablet or spray under tongue
 - i. Have patient keep mouth closed with tablet under tongue (without swallowing) until dissolved and absorbed
 - j. Recheck blood pressure
 - k. Record activity and time
 - l. Perform reassessment and evaluate patient for effect of drug
7. Actions
- a. Relaxes blood vessels
 - b. Decreases workload of heart
8. Side effects
- a. Hypotension
 - b. Headache
 - c. Pulse rate changes
 - d. Burning or stinging sensation under the tongue
9. Reassessment strategies
- a. Monitor blood pressure
 - b. Ask patient about effect on pain relief
 - c. Seek medical direction before re-administering
 - d. Record reassessments
- IX. **Age related cardiac diseases, variations, assessment and management**
- A. **Pediatrics**, causes of cardiac emergencies
 - 1. Airway obstruction
 - 2. Respiratory arrest
 - 3. Trauma
 - 4. Congenital defects
 - B. **Geriatrics**
 - 1. Internal cardiac pacemakers

MODULE 5

Medical

Lesson 5-5

Hematology

OBJECTIVES

OBJECTIVES LEGEND

C=Cognitive P=Psychomotor A=Affective

1 = Knowledge level

2 = Application level

3 = Problem-solving level

COGNITIVE OBJECTIVES

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

- 5-5.1 List components and function of blood. (C-1)
- 5-5.2 List common blood disorders. (C-1)
- 5-5.3 Identify assessment findings for common blood disorders. (C-1)
- 5-5.4 Select a management/treatment plan for common blood disorders. (C-2)

AFFECTIVE OBJECTIVES

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

- 5-5.5 Value the importance of managing patients with complications associated with blood disorders.

PSYCHOMOTOR OBJECTIVES

No psychomotor objectives identified.

PRESENTATION

Declarative (What)

- I. **Anatomy and Physiology**
 - A. **Blood**
 - 1. **Red blood cells (RBCs)-erythrocytes**
 - a. Hemoglobin, within RBCs, responsible for carrying oxygen to cells; carbon dioxide away from cells
 - b. Gives blood its primary color
 - c. Produced in bone marrow
 - d. Deficiency of RBCs is called anemia
 - 2. **White blood cells (WBCs)-leukocytes**
 - a. Mediates the body's immune system
 - b. Defends body against bacteria and microorganisms
 - c. Produced in bone marrow
 - d. Produces antibodies responsible for fighting infection
 - 3. **Platelets-thrombocytes**
 - a. Essential for clot formation
 - b. Clumping (aggregation) of platelets in the body's rapid response to stop bleeding
 - 4. **Plasma**

- a. Fluid matrix of blood
 - b. Transports blood cells throughout the body
- II. Blood disorders
- A. Sickle cell crisis
 - 1. Disease process
 - a. Inherited disorder found in African Americans
 - b. RBCs have abnormal structure (sickle shape/oblong)
 - c. Diminished oxygen carrying capability
 - 2. Assessment findings for sickle cell
 - a. Altered LOC/stroke-like symptoms
 - b. Jaundice due to liver failure
 - c. Visual disturbances
 - d. Fever due to infections
 - e. Abdominal rigidity and bloating due to enlarged spleen
 - f. Musculoskeletal pain
 - g. Priapism (abnormal, prolonged, painful penile erection)
 - h. Chest pain and difficulty breathing due to vaso-occlusive crisis
 - 3. Patient management/treatment
 - a. Administer high concentration oxygen
 - b. Ventilatory support
 - c. Suction as needed
 - d. Patient transported in position of comfort
 - e. Prompt transport, consider ALS
 - B. Thrombophilia
 - 1. Disease process
 - a. Inherited disorder
 - b. Propensity for blood clotting
 - 2. Assessment findings for thrombophilia
 - a. Altered LOC/stroke-like symptoms
 - b. Musculoskeletal pain due to clot formation
 - c. Potential formation of pulmonary emboli (PE) and deep vein thrombosis (DVT)
 - 3. Patient management/treatment
 - a. Administer high concentration oxygen
 - b. Ventilatory support
 - c. Suction as needed
 - d. Patient transported in position of comfort
 - e. Prompt transport, consider ALS
 - C. Hemophilia
 - 1. Disease process
 - a. Inherited disorder
 - b. Profuse bleeding occurs due to missing clotting mechanism
 - 2. Assessment findings for hemophilia
 - a. Acute/chronic (internal and/or external) bleeding
 - b. Bruising

- c. Shock symptoms
 - 3. Patient management/treatment
 - a. Administer high concentration oxygen
 - b. Ventilatory support
 - c. Suction as needed
 - d. Attempt to control bleeding (efforts may be futile)
 - e. Patient transported in position of comfort
 - f. Prompt transport, consider ALS
- D. Special considerations
 - 1. Anticoagulant medications (Heparin, Coumadin, Warfarin)-increase risk of bleeding
 - 2. Long term aspirin use-increase risk of bleeding
 - 3. Risk factors (smoking, birth control pills)-increase potential for blood clots

MODULE 5

Medical

Lesson 5-6

Abdomen/Gastrointestinal and Genitourinary/Renal Disorders

OBJECTIVES

OBJECTIVES LEGEND

C=Cognitive P=Psychomotor A=Affective

1 = Knowledge level

2 = Application level

3 = Problem-solving level

COGNITIVE OBJECTIVES

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

- 5-6.1 Define acute abdomen/genitourinary/renal conditions. (C-1)
- 5-6.2 List general assessment findings, sign and symptoms associated with acute abdomen/genitourinary/renal conditions. (C-1)
- 5-6.3 Discuss various conditions associated with acute abdomen/genitourinary/renal conditions. (C-3)
- 5-6.4 Differentiate between various types of dialysis. (C-2)
- 5-6.5 List assessment techniques specific to acute abdomen/genitourinary/renal conditions. (C-1)
- 5-6.6 Consider the management associated with the care of abdomen/genitourinary/renal patient. (C-3)

AFFECTIVE OBJECTIVES

- 5-6.7 Appreciate the high level of discomfort that a patient with abdomen/genitourinary/renal pain will likely exhibit. (A-1)

PSYCHOMOTOR OBJECTIVES

No psychomotor objectives identified.

PRESENTATION

Declarative (What)

- I. Introduction/Definition
 - A. Acute abdomen/genitourinary/renal conditions - sudden onset of severe abdominal pain, associated with a wide variety of underlying causes
 - B. Review of the human body and pathophysiology (see Preparatory Module)
- II. General assessment findings, signs and symptoms of acute abdomen/genitourinary/renal conditions
 - A. Pain
 - 1. Referred- pain felt in a location other than where the pain originates
 - 2. Tearing-sharp, ripping
 - 3. Parietal- localized, sharp, intense, originating from abdominal lining
 - 4. Visceral-poorly localized, diffuse, achy and dull
 - B. Nausea/vomiting
 - C. Hematemesis-vomiting of blood

- D. Melena-dark, tarry stool
 - E. Hematochezia-the passage of fresh blood
 - F. Diarrhea/constipation/bloating
 - G. Anorexia (loss of appetite)
 - H. Belching/flatulence
 - I. Distension
 - J. Guarding/rigidity
 - K. Tenderness
 - L. Signs of shock
 - M. Fever or chills
 - N. Urinary frequency and burning
 - O. Weight loss
 - P. Indigestion
- III. Conditions associated with acute abdomen and genitourinary/renal
- A. Appendicitis
 - 1. Inflammation of the appendix
 - 2. Specific signs and symptoms
 - a. Rebound tenderness
 - b. Radiating pain to the umbilicus
 - B. Pancreatitis
 - 1. Inflammation of the pancreas
 - 2. Specific signs and symptoms
 - a. Severe, referred pain from the umbilicus to the scapula
 - C. Abdominal aortic aneurysm (AAA)
 - 1. Weakened, ballooned, and enlarged area of the wall of the abdominal aorta
 - 2. Specific signs and symptoms
 - a. Gradual onset of lower lumbar and abdominal pain.
 - b. Rupture associated with sudden onset of severe, constant abdominal pain
 - c. Pain described as “tearing”, may radiate to lower back, flank and pelvis.
 - d. Pulsating mass may be felt
 - D. Cholecystitis
 - 1. inflammation/obstruction of the gallbladder
 - 2. Specific signs and symptoms
 - a. Severe sudden right upper quadrant (RUQ) pain
 - b. Epigastric pain
 - c. Referred pain to right shoulder
 - E. Bowel obstruction
 - 1. Specific signs and symptoms
 - a. Vomiting with fecal odor
 - F. Hernia
 - 1. Specific signs and symptoms
 - a. Abdominal/groin mass or lump
 - G. Ulcers

1. Specific signs and symptoms
 - a. Epigastric pain
 - b. Severe cases: dark or black stool, vomiting blood or coffee-ground emesis
- H. Esophageal varices
 1. Specific signs and symptoms
 - a. Vomiting copious amounts of bright red blood
 - b. Shock in severe cases
- I. Peritonitis
 1. Inflammation of the lining of the peritoneum that can be life-threatening
 2. Specific signs and symptoms
 - a. Abdomen becomes rigid and painful
 - b. High fever and chills
- J. Kidney/renal Failure
 1. Occurs when the kidneys lose their ability to adequately filter the blood, remove the toxins and excessive fluid from the body.
 2. Specific signs and symptoms
 - a. Weight gain due to fluid retention
 - b. Altered LOC
 - c. Varying degrees of shortness of breath due to edema
 3. Related terms
 - a. Hemodialysis-mechanical filtering of blood, removing toxins and excess fluid from the body
 - (1) Shunt
 - (2) Fistula
 - (3) Graft
 - (4) Note: do not perform any intervention on the arm containing one of the above devices (blood pressure, injection)
 - (5) Complications/Adverse Effects of Dialysis
 - (a) Hypotension
 - (b) Muscle cramps
 - (c) Nausea/vomiting
 - (d) Hemorrhage especially from access site
 - (e) Infection at access site
 - (6) Missed Dialysis Treatment
 - (a) Weakness
 - (b) Pulmonary edema
 - (7) Management for a Patient With a Dialysis Emergency
 - (a) ABCs, support ventilation
 - (b) Stop Bleeding From Shunt as Needed
 - (i) Direct pressure
 - (ii) Elevation
 - (iii) Hemostatic dressings as needed

- (iv) Tourniquet should be avoided as it may damage the fistula
 - (v) Contact medical direction if bleeding remains uncontrolled and you are considering tourniquet use
 - (c) Positioning
 - (i) Supine If showing signs of shock
 - (ii) Fowler's if pulmonary edema is present
 - b. Peritoneal dialysis-patients manage their renal disease from home on a daily basis through the use of a permanent catheter that is implanted through the abdominal wall and into the peritoneal cavity
 - (1) Note: Provider should wear a face mask if working near the peritoneal catheter
 - K. Kidney Stones
 - 1. Grains of various size traveling from the kidney through the urethra
 - 2. Specific signs and symptoms
 - a. Severe flank pain
 - b. Hematuria
 - L. Urinary catheters
 - 1. Complications include infection, trauma from a catheter becoming dislodged
- IV. Assessment techniques
 - A. Inspection (distention, bloating)
 - B. Palpation (rigidity, tenderness, pain)
- V. Management
 - A. Keep patient quiet and place in position of comfort, usually flexing the legs is most comfortable (fetal position)
 - B. Airway management (oxygen, suctioning)
 - C. Treat for shock
 - D. Consideration for ALS intercept
 - E. Prompt transport

MODULE 5

Medical

Lesson 5-7

Endocrine Disorders and Neurology

OBJECTIVES

OBJECTIVES LEGEND

C=Cognitive P=Psychomotor A=Affective

1 = Knowledge level

2 = Application level

3 = Problem-solving level

COGNITIVE OBJECTIVES

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

- 5-7.1 Identify types of diabetes. (C-1)
- 5-7.2 Interpret the relationship between insulin and glucose in the production of energy within the body's cells. (C-3)
- 5-7.3 Compare assessment findings and symptoms associated with hyperglycemia and those associated with hypoglycemia. (C-3)
- 5-7.4 Discuss metabolic shock as it related to diabetic emergencies. (C-1)
- 5-7.5 Identify patient management for a patient with hyperglycemia. (C-1)
- 5-7.6 Identify patient management for a patient with hypoglycemia. (C-1)
- 5-7.7 Discuss blood glucose measurement. (C-3)
- 5-7.8 State the generic and trade names, medication forms, dose, administration, action, and contraindications for oral glucose. (C-1)
- 5-7.9 State the generic and trade names, medication forms, dose, administration, action, and contraindications for glucagon. (C-1)
- 5-7.10 Discuss other causes of altered levels of consciousness besides diabetic emergencies. (C-3)
- 5-7.11 **Discuss age-related variations for pediatric and geriatric assessment and management of endocrine and neurological conditions. (C-3)**

AFFECTIVE OBJECTIVES

- 5-7.12 Explain the importance of understanding why some geriatric patients may exhibit inappropriate behavior due to an underlying medical condition such as stroke, dementia, or delirium. (A-3)

PSYCHOMOTOR OBJECTIVES

- 5-7.13 Demonstrate steps in management for a patient with hyperglycemia. (P-1,2)
- 5-7.14 Demonstrate steps in management for a patient with hypoglycemia. (P-1,2)
- 5-7.15 Demonstrate steps in obtaining a blood glucose reading. (P-2)
- 5-7.16 Demonstrate steps in the administration of oral glucose. (P-1,2)
- 5-7.17 Demonstrate steps in administering an IM injection of glucagon to a diabetic patient. (P-2)
- 5-7.18 Demonstrate creating a management plan for a patient experiencing an endocrine and neurological condition. (P-2)

- 5-7.19 Demonstrate completing a prehospital care report for patients with diabetic emergencies. (P-2)

PRESENTATION

- I. Diabetes Mellitus
 - A. Defined
 1. Autoimmune disorder
 2. Caused by a decrease in the amount of insulin being produced
 3. Result is an imbalance between glucose available in the bloodstream and the cell's need for the sugar
 4. Inability to metabolize glucose
 - B. Types
 1. Type I - Juvenile onset – (formally known as insulin dependent)
 2. Type II – Adult onset, (formally known as non-insulin dependent); inadequate amounts of insulin produced; patient may be on oral medications that stimulate the pancreas to produce more insulin (glyburide, Diabinase, Orinase)
 - C. Insulin and glucose
 1. Insulin-hormone produced in the pancreas responsible for opening cell gates that allow glucose to enter
 2. Glucose-simple sugar that provides all living cells of the body with energy, for metabolism
 - D. **History and assessment findings** associated with hyperglycemia (diabetic coma)-condition where there is plenty of glucose available in the blood stream, but insufficient insulin to allow sugar to pass into the cells
 1. Gradual onset
 2. Altered LOC – could be unresponsive or comatose
 3. Rapid, weak pulse
 4. Pale, warm, flushed, dehydrated skin (**poor skin turgor**)
 5. **Polyuria (frequent urination), polydipsia (excessive thirst) and polyphagia (excessive eating)**
 6. Deep, rapid respirations (Kussmaul)
 7. Sweet, fruity odor to breath
 8. Uncharacteristic behavior
 9. **Weakness**
 10. Abdominal pain, **nausea/vomiting**
 11. **Medical alert identification**
 - E. **History and assessment findings** associated with hypoglycemia (insulin shock) – low blood sugar. Condition results when there is a low level of glucose in the blood stream. Insulin levels being adequate.
 1. Sudden onset
 2. Altered LOC – confusion, irritability, combative
 3. Seizures and coma possible
 4. Full, rapid pulse
 5. BP, normal

6. Skin - sweating
 7. Normal to rapid respirations
 8. Intense hunger, drooling, and headache
 9. Medical alert identification
- F. Metabolic Shock – caused by an imbalance between production and elimination of acids, causing fluid imbalances and weakened vessel of the vascular system. Patients with diabetes are susceptible to metabolic acidosis and shock.
- G. Normal blood glucose levels
1. 70 – 120 mg/dl (guidelines/ranges may vary)
 2. Measurement obtained by use of a glucometer
- H. Patient management
1. Assess LOC and ABC's
 2. High priority, rapid transport, and consider ALS intercept
 3. Maintain an open airway and provide oxygen
 4. If blood glucose is low and patient is conscious, administer oral glucose
 5. If blood glucose is low and patient is unresponsive, administer glucagon
- I. Blood glucose measurement
1. Contact medical control, if protocol necessitates
 2. Explain procedure and obtain consent, when possible
 3. Select site for obtaining sample
 4. Cleanse site with alcohol prep-pad and allow to dry
 5. Turn glucometer on, following digital prompts for directions
 6. Using sterile lancet, pierce the skin
 7. Properly dispose of lancet
 8. "Milk" the finger to obtain a small sample of blood
 9. Wipe away initial blood droplet with sterile gauze
 10. Deposit second blood sample on glucometer test strip
 11. Process the blood sample
 12. Bandage site as appropriate
 13. Obtain reading and record data
 14. Properly dispose of all biohazard materials
 15. Continue to monitor patient status
- J. Medications
1. Oral Glucose
 - a. Medication Name
 - (1) Generic - Glucose, Oral
 - (2) Trade - Glucose, Insta-glucose
 - b. Indications - patients with altered mental status and/or a known history of diabetes controlled by medication
 - c. Contraindications
 - (1) Unresponsive
 - (2) Unable to swallow
 - d. Medication form - Gel

- e. Dosage – 15-25 g
 - f. Administration
 - (1) Obtain order from medical control
 - (2) 6 R's of medication administration
 - (3) Assure assessment findings and symptoms of altered mental status
 - (4) Assure patient is conscious, can swallow and protect their airway
 - (5) Administer glucose - Between cheek and gum (bucally)
 - (6) Perform reassessment
 - (7) Document on prehospital care report
 - g. Actions - increases blood sugar
 - h. Side effects - none when given properly. May be aspirated by the patient without a gag reflex.
 - i. Re-assessment strategies – maintain airway patency
2. Glucagon
- a. Medication Name
 - (1) Generic - glucagon
 - (2) Trade – Glucagon, **Glucagen**
 - b. Indications – unresponsive patients
 - c. Contraindications
 - (1) Allergy/hypersensitivity to drug
 - d. Medication form – powdered tablet, reconstituted in 1ml of diluent
 - e. Dosage – 1mg
 - f. Administration
 - (1) Obtain order from medical control
 - (2) 6 R's of medication administration
 - (3) Report assessment findings including signs and symptoms of hypoglycemia and blood glucose measurement
 - (4) Report prior interventions
 - (5) Reconstitute glucagon
 - (a) Inspect package and both vials insuring right medication, dose and expiration date
 - (b) Remove “flip-off” seals from vials
 - (c) Wipe rubber stoppers with alcohol prep-pad
 - (d) Using sterile 3 ml IM syringe, remove needle protector from syringe
 - (e) Draw plunger back to 1ml (cc) mark (syringe now contains 1ml of air)
 - (f) Pierce the center of the stopper of the vial containing the diluting solution with the needle of the syringe

- (g) Turn the vial upside down and inject the 1 ml of air from the syringe into the vial (this procedure makes it easier to withdraw fluid from vial)
 - (h) Keeping the tip of the needle in the diluent, withdraw fluid from vial into the syringe
 - (i) Remove syringe from vial and pierce the center of the stopper of the vial, containing 1mg powdered glucagon, with the syringe
 - (j) Inject all of the diluent into the glucagon
 - (k) Remove the diluent syringe from the vial and dispose of in sharps container
 - (l) Shake the vial gently until the glucagon dissolves and the solution becomes clear.
Note: glucagon should be clear and water-like in consistency. It should be utilized immediately after reconstituting.
 - (m) Using a new syringe and appropriately sized needle, pierce the center of the rubber stopper and withdraw slightly more of the medication than the ordered dose
 - (n) Remove the needle and syringe from the vial
 - (o) With the needle pointing upward, gently tap the syringe to move any air bubbles to the top. Gently advance the syringe to the 1 ml mark. (Children less than 20 kg (44 lbs) a dose of 0.5 mg is used). Note: Dosage established by medical control must be administered
- (6) Perform the IM injection
- (a) Cleanse the injection site using an alcohol prep-pad
 - (b) Raise the injection site by pinching or stretching the flesh
 - (c) Insert the needle into the selected and cleansed injection site at a 90 degree angle
 - (d) Aspirate slightly by attempting to withdraw the plunger of the syringe. If no blood is seen to aspirate into the syringe, use light pressure to depress the plunger and inject all the medication. If blood is seen to aspirate, a second site must be used
 - (e) Depress the plunger to administer the injection
 - (f) Withdraw the needle from the injection site
 - (g) Wipe the injection site with an alcohol prep-pad
 - (h) Properly dispose of the syringe and needle assembly in an appropriate sharps container and place a band-aid over the injection site

- (7) Continue to monitor patient status
 - (8) Continue oxygen therapy
 - (9) Repeat dosage per medical direction, if requested
 - (10) Document on prehospital care report
 - g. Actions – triggers release of stored glucose from liver and skeletal muscles
 - h. Side effects – hypotension, nausea/vomiting
 - i. Re-assessment strategies – monitor patient's LOC and vital signs, document and communicate patient response to medication administration
 - K. Consider age-related variations for pediatric and geriatric assessment and management
 1. Pediatric
 - a. Usually insulin dependent called juvenile diabetes
 - b. Late stages of hypoglycemia may have cerebral edema
 - c. Prone to seizures
 - d. Prone to dehydration
 - e. May be undiagnosed
 2. Geriatric
 - a. Can mask signs and symptoms of myocardial infarction
 - b. Prone to dehydration and infections
- II. Causes of altered mental status (in addition to diabetic emergencies)
 - A. Varied conditions
 1. Syncopal episodes (fainting), also known as psychogenic shock – a self correcting episode of unresponsiveness, resulting from a sudden, temporary reduction in blood supply to the brain, induced by dilation of the blood vessels. Excessive grief, joy, fear or other emotion can cause this type of shock
 2. Seizures
 3. Stroke
 4. Poisoning
 5. Infection
 6. Head trauma
 7. Hypoxia
 8. Dementia
 - a. Brain disorder with memory impairment
 - b. Multiple causes, including Alzheimer's disease
 - c. Gradual decline over several years
 - B. Patient management
 1. Assure patency of airway
 2. Be prepared to artificially ventilate/suction
 3. Transport
 4. Consider trauma
- III. Seizures
 - A. Causes
 1. Epilepsy

2. High fever
 3. Infections
 4. Poisonings
 5. Hypoglycemia or hyperglycemia
 6. Head trauma
 7. Shock
 8. Hypoxia
 9. Stroke
 10. Drug or alcohol withdrawal
 11. Dysrhythmias
 12. Hypertension
 13. Pregnancy complications
 14. Unknown origin (idiopathic)
- B. Types
1. Simple partial seizures
 - a. Muscle twitching localized to one part of the body
 - b. Patient responsive and aware of occurrence
 2. Complex partial seizures
 - a. 1-2 minute duration
 - b. Blank stare exhibited by patient
 - c. No response to commands
 3. Febrile seizure
 - a. Most common in children; rarely life-threatening
 - b. Caused by high fever
 - c. Short in duration
 4. Generalized Seizure-Tonic-clonic seizure
 - a. Tonic-clonic seizures-phases
 - (1) Aura
 - (2) Tonic phase-muscle contraction for 15-30 sec.
 - (3) Clonic phase-convulsions (muscles contract and relax; approximately 1-2 minutes)
 - (4) Postictal Phase-last 15-30 minutes; patient difficult to arouse; incontinence may occur
 - b. Status epilepticus-prolonged seizure activity without a state of meaningful consciousness; true emergency
- C. **Assessment findings and symptoms**
1. Spasms, muscle contractions
 2. Bitten tongue, increased secretions
 3. Sweating
 4. Cyanosis
 5. Unconscious, gradually increasing level of consciousness
 6. May cause shaking or tremors and no loss of consciousness
 7. Incontinent
 8. Amnesia of event
- D. **Patient management**
1. Assure patency of airway

2. Position patient on side if no possibility of cervical spine trauma
 3. Have suction ready
 4. Assist ventilations if needed
 5. Oxygen therapy
 6. **Pulse oximetry**
 7. **Emotional support**
 8. Transport
 - a. Although brief seizures are not harmful, there may be a more dangerous underlying condition
 - b. Rule out trauma, head injury can cause seizures
- IV. Stroke (Cerebral Vascular Accident (CVA))
- A. Types/causes of stroke
 1. Ischemic stroke
 - a. Thrombosis
 - b. Embolism
 2. Hemorrhagic stroke
 3. Transient Ischemic Attack (TIA)-miniature stroke, usually occurring days prior to a thrombotic stroke
 - B. Assessment findings and symptoms
 1. Confusion, dizzy, weak
 2. Decreased 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. Hypertension
 10. Difficult respiration or snoring
 11. Nausea and vomiting
 12. Loss of bowel or bladder control
 13. Decreased or absent sensation in one or more extremities or other areas of the body
 14. Coma
 - C. Patient management
 1. Airway management
 2. Breathing – supplemental oxygen versus assisted ventilations
 3. Assess responsiveness
 4. **Determine onset of symptoms**
 5. Cincinnati Prehospital Stroke Scale
 6. High priority patient
 7. Rapid transport - AHA establishes critical time frame to thrombolytic therapy
 8. **Emotional support**
 9. **Assess for injuries**
 10. **Pulse oximetry**

11. Consider transport to specialized care facility
 12. OPQRST
 13. SAMPLE History
 14. Baseline vitals and repeated vitals
 15. Obtain blood glucose reading
- V. The geriatric patient exhibiting signs and symptoms of neurological emergencies
- A. Likely causes
 1. Stroke and Transient Ischemic Attack
 2. Delirium – sudden, rapid deterioration
 3. Dementia – gradual progression
 4. Head and spine trauma

Module 5

Medical

Lesson 5-8

Immunology

OBJECTIVES

OBJECTIVES LEGEND

C=Cognitive P=Psychomotor A=Affective

1 = Knowledge level

2 = Application level

3 = Problem-solving level

COGNITIVE OBJECTIVES

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

- 5-8.1 Differentiate between an allergic reaction and anaphylaxis. (C-1)
- 5-8.2 Describe the basic immune system's response to allergens (C-1)
- 5-8.3 Describe the pathophysiology involved with hypersensitivity to the presence of an allergen. (C-1)
- 5-8.4 List assessment findings and symptoms for allergic reactions and anaphylaxis. (C-1)
- 5-8.5 Discuss a drug profile for epinephrine. (C-1)
- 5-8.6 Differentiate patient management for a patient with allergic reaction and anaphylaxis. (C-3)

AFFECTIVE OBJECTIVES

- 5-8.7 Recognizes the potential life-threatening situation involved with anaphylaxis. (C-3)

PSYCHOMOTOR OBJECTIVES

- 5-8.8 Demonstrate management of the patient experiencing a severe allergic reaction. (P-1,2)
- 5-8.9 Demonstrate the use of epinephrine auto-injector. (P-1,2)
- 5-8.10 Demonstrate the assessment and documentation of patient response to an epinephrine injection. (P-1,2)
- 5-8.11 Demonstrate proper disposal of equipment. (P-1,2)
- 5-8.12 Create a management plan to include evaluation and treatment of a patient experiencing an anaphylactic reaction. (P-3)
- 5-8.13 Demonstrate completing a prehospital care report for patients with allergic emergencies. (P-2)

PRESENTATION

Declarative (What)

- I. **Definitions and introduction**
 - A. Allergic reaction- an exaggerated immune response to a foreign substance (allergen)

- B. Anaphylaxis – a life-threatening reaction to an allergen, resulting in a systemic release of histamines
 - C. Risk factors and common allergens
 1. Insect bites/stings - bees, wasps
 2. Food - nuts, crustaceans, peanuts
 3. Plants
 4. Medications
 5. Latex
- II. Immune system response to allergens
- A. Response purpose
 1. Compensatory response results in the release of histamine
 - B. Response type
 1. Local (involving a specific area of the body)
 2. Systemic (involving the entire body)
 - C. Response speed
 1. Minor - take minutes to hours to develop
 2. Major – often immediate (occasionally delayed 30 minutes)
- III. Pathophysiology
- A. Increased capillary permeability - capillaries leak; fluid moves into the tissue; appears as swelling around the site of the injection (or sting); of most concern is swelling to the face (eyes, lips, ears, tongue and airway)
 - B. Vasodilatation - dilation of blood vessels reduces amount of blood returning to the heart; leads to decreased cardiac output and increased risk of shock
 - C. Bronchoconstriction - constriction of the bronchioles causes decreased movement of air in the lungs; wheezing and difficulty breathing
 - D. Increased mucus production - mucus production increases in lungs and nasal passages
- IV. Assessment findings and symptoms
- A. Allergic reactions
 1. Respiratory
 - a. Sneezing
 - b. Tightness in chest
 - c. Cough
 - d. Rapid and labored breathing
 - e. Wheezing
 - f. Stridor
 2. Cardiovascular
 - a. Tachycardia
 3. Skin
 - a. Pale or redness
 - b. Hives
 - c. Localized or generalized swelling
 - d. Itching
 4. Other findings
 - a. Anxiety

- b. Itchy, watery eyes
 - c. Dizziness
 - B. Anaphylaxis (in addition to findings associated with allergic reaction)
 - 1. Respiratory
 - a. Severe respiratory distress leading to arrest
 - b. Wheezing to silent chest
 - 2. Cardiovascular
 - a. Tachycardia leading to bradycardia/arrest
 - b. Hypotension
 - 3. Skin
 - a. Cyanosis
 - b. Angioedema (extreme, severe swelling)
 - 4. Other findings
 - a. Decreasing mental status/coma
 - b. Decreased oxygen saturation
 - c. Hoarseness
 - d. Feeling of impending doom
- V. Patient management
 - A. Allergic reactions
 - 1. Perform assessment
 - a. History of allergies
 - b. What was patient exposed to?
 - c. How were they exposed?
 - d. What effects?
 - e. Progression of reaction
 - f. Interventions performed?
 - 2. Assess baseline vital signs and SAMPLE history
 - 3. Administer oxygen
 - 4. Provide emotional support
 - 5. Record findings
 - 6. Transport
 - B. Anaphylaxis (in addition to management associated with allergic reaction)
 - 1. Rapid transport
 - 2. Contact medical control
 - 3. May require advanced airway management
 - 4. Administer epinephrine
 - 5. Consider ALS
- VI. Medication administration - Epinephrine auto-injector
 - A. Medication name
 - 1. Generic - Epinephrine
 - 2. Trade - Adrenalin
 - B. Indications
 - 1. Anaphylaxis
 - 2. Medical control authorizes use
 - C. Contraindications – no absolute contraindications

- D. Relative contraindications – coronary artery disease, pregnancy, hypertension, age, diabetes
- E. Medication form – liquid
- F. Dosage
 - 1. EpiPen® 0.3 mg (1:1000) patients weighing more than 66 lbs.
 - 2. EpiPen®Jr. - 0.15 mg (1:2000) patients weighing between 33 and 66 lbs.
 - 3. Note: Epinephrine may be administered by other methods with additional training
- G. Administration
 - 1. Obtain order from medical control
 - 2. 6 R's of medication administration
 - 3. Remove safety cap from the auto-injector
 - 4. Place tip of auto-injector against the patient's lateral thigh, midway between the hip and knee; stabilize extremity while injecting
 - 5. Push the injector firmly until the injector activates
 - 6. Hold the injector in place for 10 seconds
 - 7. Document on prehospital care report
 - 8. Dispose of injector in sharps container
- H. Action
 - 1. Dilates the bronchioles
 - 2. Constricts blood vessels
 - 3. Slows allergic response
- I. Side effects
 - 1. Increased heart rate
 - 2. Pallor
 - 3. Dizziness
 - 4. Chest pain/palpitations
 - 5. Headache
 - 6. Nausea/vomiting
 - 7. Excitability, anxiety, tremors
 - 8. Increased blood pressure
- J. Re-assessment strategies
 - 1. Transport decision reevaluated
 - 2. Continue assessment of airway, breathing and circulatory status
 - 3. Reevaluate need for additional dosing; requires contact with medical control

MODULE 5

Medical

Lesson 5-9

Toxicology

OBJECTIVES

OBJECTIVES LEGEND

C=Cognitive P=Psychomotor A=Affective

1 = Knowledge level

2 = Application level

3 = Problem-solving level

COGNITIVE OBJECTIVES

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

- 5-9.1 Define toxicology, poisoning and overdose. (C-1)
- 5-9.2 Discuss each route of entry, signs and symptoms and patient management. (C-3)
- 5-9.3 List general interview questions involving a poisoning or overdose. (C-1)
- 5-9.4 Discuss various drugs of abuse, assessment findings and symptoms and patient management. (C-3)
- 5-9.5 Discuss common medication overdoses, assessment findings and symptoms and patient management. (C-3)
- 5-9.6 State the generic and trade names, indications, contraindications, medication form, dose, administration, actions, side effects and re-assessment strategies for activated charcoal. (C-1)
- 5-9.7 Discuss considerations for age-related variations for pediatric and geriatric assessment and management. (C-1)

AFFECTIVE OBJECTIVES

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

- 5-9.8 Explain the rationale for contacting medical direction and poison control early in the management of the poisoning or overdose patient. (A-3)

PSYCHOMOTOR OBJECTIVES

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

- 5-9.9 Demonstrate the steps in the patient management for the patient with possible overdose. (P-1, 2)
- 5-9.10 Demonstrate the steps in the patient management for the patient with suspected poisoning. (P-1, 2)
- 5-9.11 Prepare documentation for a patient with possible poisoning or overdose. (P-1,2)

PRESENTATION

Declarative (What)

- I. Definitions and Introduction

- A. Toxicology- branch of science concerned with poisons, their nature, effects and antidotes
 - B. Poisoning- the condition produced by a poison or by a toxic substance
 - C. Overdose- excessive amount of medication or illegal drug (accidental or intentional) to cause potential harm to normal functions
 - D. National Poison Control Center (1-800-222-1222) - organization providing resources and information regarding poisons
- II. Routes of entry
- A. Ingestion – poison enters the body through the GI tract
 - 1. Examples: household chemicals, industrial/agricultural chemicals, medications, improperly prepared or stored foods, petroleum products, agricultural
 - 2. Assessment findings and symptoms
 - a. History of ingestion
 - b. Nausea/vomiting
 - c. Diarrhea
 - d. Altered mental status
 - e. Abdominal pain
 - f. Fever
 - g. Chemical burns around the mouth
 - h. Unusual breath odors
 - 3. Patient management
 - a. Detect and treat immediate life threats
 - b. Perform a secondary assessment and remove pills, tablets or fragments with gloves from patient's mouth, as needed.
 - c. Consider safe transport of packaged materials with the patient
 - d. Assess baseline vital signs
 - e. Consult medical direction and/or poison control center
 - f. Bring containers, bottles and/or labels of poison to receiving facility if safe and possible
 - g. Establish transport decision
 - h. Perform a reassessment en route
 - B. Inhalation – poison enters through the respiratory system
 - 1. Examples: carbon monoxide, ammonia, chlorine, paints, insect sprays, solvents, propane, petroleum products, cleaning fluids, glue, aerosolized cleaners, white-out, paint thinner
 - 2. Assessment findings and symptoms
 - a. History of inhalation
 - b. Difficulty breathing
 - c. Chest pain
 - d. Cough
 - e. Hoarseness
 - f. Dizziness
 - g. Headache
 - h. Confusion

- i. Seizures
- j. Altered mental status
- 3. Patient management
 - a. Use standard precautions
 - b. Safely remove patient from environment. Specialized rescue may be required
 - c. Administer oxygen
 - d. Obtain vital signs
 - e. Safely transport all containers and/or labels of poison agents to receiving facility
 - f. Perform a reassessment en route
- C. Injection – enters via subcutaneous, intramuscular or intravascular access
 - 1. Examples: illicit drugs, venom, insect bites or stings, marine life
 - 2. Assessment findings and symptoms
 - a. Altered LOC
 - b. Respiratory compromise
 - c. Weakness
 - d. Dizziness
 - e. Chills
 - f. Fever
 - g. Nausea/vomiting
 - h. Abnormal pupils
 - 3. Patient management
 - a. Scene safety
 - b. Consider law enforcement
 - c. Airway management
 - d. Administer oxygen
 - e. Obtain baseline vital signs
 - f. Bring containers, bottles and/or labels of poison to receiving facility if safe and possible
 - g. Perform a reassessment en route
- D. Absorption - enters through the skin
 - 1. Examples: agricultural chemicals, plant materials
 - 2. Assessment findings and symptoms
 - a. History of exposure
 - b. Presence of chemical residue on skin
 - c. Burns
 - d. Itching
 - e. Irritation
 - f. Redness
 - g. Altered mental status
 - 3. Patient management
 - a. Standard precautions
 - b. Utilize Emergency Response Guidebook as informational resource
 - c. Manage life-threatening conditions

- d. Evaluate the need for prompt transport
 - e. Obtain baseline vital signs
 - f. Skin - remove contaminated clothing
 - (1) Powder - brush powder off patient, then irrigate
 - (2) Liquid - irrigate with water for a minimum of 20 minutes; continue enroute
 - g. Eye(s) - irrigate with water, away from unaffected eye for at least 20 minutes; continue enroute. If both eyes are affected flush from the middle of the nose outward.
 - h. Transport the patient with containers, bottles, MSDS sheets and labels from the substance if safe and possible
 - i. Perform reassessments en route
- III. General interview questions
- A. What substance was involved?
 - B. When did the exposure occur?
 - C. Quantity of exposure?
 - D. Duration of exposure?
 - E. What intervention(s) has the patient, family or well-meaning bystanders taken?
 - F. What is the patient's estimated weight?
 - G. What effects is the patient experiencing from the exposure?
- IV. Drugs of Abuse
- A. Opiates and narcotics
 - 1. Common causative agents (morphine, oxycodone, Demerol, Codeine)
 - 2. Assessment findings and symptoms
 - a. Decreased level of consciousness, sedation
 - b. Hypotension
 - c. Respiratory depression/arrest
 - d. Nausea
 - e. Pinpoint pupils
 - f. Seizures and coma
 - 3. Patient management
 - a. Scene safety, especially if illicit drugs are involved. Consider law enforcement
 - b. Perform thorough assessments
 - c. Obtain baseline vital signs.
 - d. Manage airway
 - e. Treat for shock
 - f. Protect the patient from self-injury and his attempts to injury others. Use restraints as per EMS protocol
 - g. Immediate transport
 - h. Contact medical direction as needed
 - i. Perform reassessments en route
 - B. Alcohol

1. Alcoholism – signs of physical addiction to alcohol that interfere with activities of daily living, social, and family interactions
 2. Alcohol Abuse – reoccurring use of alcohol despite negative consequences
 3. Alcohol Withdrawal
 - a. Tremors, sweating, weakness
 - b. Hallucinations and seizures
 4. Assessment findings and symptoms
 - a. Alcohol Abuse
 - (1) Odor of alcohol on the patient's breath or clothing
 - (2) Swaying or unsteadiness of movement
 - (3) Slurred speech, rambling thought patterns, incoherent words or phrases
 - (4) A flushed appearance to the face, often with the patient sweating and complaining of being warm
 - (5) Respiratory depression
 - (6) Nausea/vomiting
 - (7) Poor coordination/slowed reaction time
 - (8) Blurred vision
 - (9) Confusion
 - (10) Hallucinations, visual or auditory
 - (11) Lack of memory (blackout)
 - (12) Altered mental status
 - b. Alcohol withdrawal
 - (1) Confusion and restlessness
 - (2) Unusual behavior
 - (3) Hallucinations
 - (4) Gross tremor of the hands
 - (5) Profuse sweating
 - (6) Seizures
 - (7) Hypertension
 - (8) Tachycardia
 5. Patient management
 - a. Airway management
 - b. Assess for injuries
 - c. Be alert for changes in mental status
 - d. Monitor baseline vital signs
 - e. Treat for shock
 - f. Protect the patient from self-injury. Use of restraints is per local protocol. Request assistance from local law enforcement
 - g. Stay alert for seizure activity and treat accordingly
 - h. Perform reassessment with monitoring of vital signs and mental status.
- C. Common Causative Agents
1. Cannabis (Marijuana)

- a. **Assessment findings and symptoms**
 - (1) Euphoria
 - (2) Anxiety
 - (3) Altered level of consciousness
 - (4) Hunger
 - (5) Thirst
 - (6) Chest pain (usually due to the anxiety levels)
 - (7) Hypertension
 - (8) Increased heart rate
 - (9) Dry mouth
 - (10) Reddening of the eyes
 - b. **Patient management**
 - (1) Manage airway, provide ventilatory assistance as needed
 - (2) Obtain baseline vital signs
 - (3) Assess for injuries
 - (4) Perform reassessment
2. **Hallucinogens (LSD, Mescaline, PCP, STP, Ecstasy)**
- a. **Assessment findings and symptoms**
 - (1) Altered level of consciousness (including coma)
 - (2) Increased heart rate
 - (3) Hypertension
 - (4) Dilated pupils (blurring of vision)
 - (5) Flushed face
 - (6) Sweating
 - (7) Patient will state they “see and hear” things
 - (8) Has very little concept of real time, may not be aware of true environment
 - (9) Incomprehensible words
 - (10) Tremors
 - (11) Headaches
 - (12) Extremes of aggression or very timid
 - b. **Patient management**
 - (1) Scene safety; law enforcement is recommended
 - (2) Manage airway
 - (3) Obtain baseline vital signs
 - (4) Manage injuries
 - (5) Perform reassessment
3. **Stimulants (Amphetamines, Cocaine, Methamphetamines, Ritalin, Nicotine)**
- a. **Assessment findings and symptoms**
 - (1) Effects on the CNS (patient may be very excitable)
 - (2) Altered level of consciousness
 - (3) Increased heart rate
 - (4) Hypertension
 - (5) Increased respiratory rate

- (6) Increased blood sugar levels
- (7) Increased body temperature
- (8) Potential seizure activity
- (9) Dilated pupils
- (10) Nausea
- (11) Muscle spasms
- (12) Dry mouth
- (13) Rapid speech
- b. Patient management
 - (1) Scene safety; law enforcement is recommended
 - (2) Manage airway
 - (3) Obtain baseline vital signs
 - (4) Assess and treat injuries
 - (5) Perform reassessment
 - (6) Be cautious of the patient with repeated high doses as it can produce a “speed run”. Patient will be restless, hyperactive and usually very apprehensive and uncooperative. Use of restraints would be per local protocol.
- 4. Barbiturates/sedatives/hypnotic (Phenobarbital, Secobarbital, Amobarbital)
 - a. Assessment findings and symptoms
 - (1) Altered level of consciousness
 - (2) Lack of coordination of body and speech
 - (3) Decreased heart rate
 - (4) Decreased respiratory rate
 - (5) Hypotension
 - (6) Pupils slow to react to non-reactive
 - (7) Skin, cool, clammy and pale
 - b. Patient management
 - (1) Scene safety; law enforcement is recommended
 - (2) Manage airway
 - (3) Obtain baseline vital signs
 - (4) Assess and treat injuries
 - (5) Treat for shock
 - (6) Perform reassessment
- V. Medication Overdose
 - A. Common medication overdoses (other than drugs of abuse)
 - 1. Cardiac medications (nitroglycerin)
 - 2. Psychiatric medications (Zoloft, Valium, Haldol, Xanax, Wellbutrin, Seroquel)
 - 3. Non-prescription pain medications (salicylates and acetaminophen)
 - a. Assessment findings and symptoms
 - (1) History of ingestion
 - (2) Nausea/vomiting
 - (3) Diarrhea

- (4) Altered mental status
- (5) Abdominal pain
- b. Patient management
 - (1) Scene safety
 - (2) Possible suicide attempt (use caution approaching patient; law enforcement assist)
 - (3) Manage life threats
 - (4) Manage airway
 - (5) Immediate transport
 - (6) Obtain baseline vital signs
 - (7) Place patient in recovery position
 - (8) If patient vomits, save and transport to receiving medical facility
 - (9) Consult medical direction and/or poison control center
 - (10) Bring containers, bottles and/or labels of poison to receiving facility if safe and possible
 - (11) Treat for shock
 - (12) Perform a reassessment en route
 - (13) Emergency Response Guidebook
- VI. Medication administration – refer to local protocols
 - A. Activated charcoal
 - 1. Medication name
 - a. Generic - Activated charcoal
 - b. Trade – InstaChar, Actidose
 - 2. Indications - poisoning by ingestion
 - 3. Contraindications
 - a. Altered mental status
 - b. Ingestion of acids or alkalis
 - c. Unable to swallow
 - 4. Medication form
 - a. Pre-mixed in water, available in containers of 12.5, 25 and 50 grams
 - 5. Dosage
 - a. Adults and children: 1 gram activated charcoal/kg of body weight
 - b. Usual adult dose: 25 - 50 grams
 - c. Usual infant/child dose: 12.5 - 25 grams
 - 6. Administration
 - a. Obtain order from medical control
 - b. 6 R's of medication administration
 - c. Container must be shaken thoroughly
 - d. Patient may need to be persuaded to drink it
 - e. A covered container and a straw may improve patient compliance since the patient cannot see the medication this way

- f. If patient takes a long time to drink the medication, the charcoal will settle and will need to be shaken or stirred again
 - g. Document on prehospital care report
 - 7. Actions - Binds (**adsorbs**) to certain poisons and prevents them from being absorbed into the body
 - 8. Side effects
 - a. Black stools
 - b. Nausea/vomiting
 - c. If the patient vomits, the dose may be repeated per medical direction
- VII. **Consider age-related variations for pediatric and geriatric assessment and management**
- A. **Pediatric**
 - 1. **Toddler-aged prone to ingestions of toxic substances**
 - 2. **Adolescent prone to experimentation with drugs of abuse**
 - B. **Geriatric**
 - 1. **Alcoholism is common**
 - 2. **Suicide (accidental or intentional)**

MODULE 5

Medical

Lesson 5-10

Psychiatric

OBJECTIVES

OBJECTIVES LEGEND

C=Cognitive P=Psychomotor A=Affective

1 = Knowledge level

2 = Application level

3 = Problem-solving level

COGNITIVE OBJECTIVES

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

- 5-10.1 Identify and define terms associated with psychological emergencies. (C-1)
- 5-10.2 List factors that may alter a patient's behavior. (C-1)
- 5-10.3 Identify underlying causes of psychiatric disorders. (C-1)
- 5-10.4 Discuss various psychiatric emergencies. (C-3)
- 5-10.5 Identify factors that may contribute to acute psychosis. (C-1)
- 5-10.6 Discuss factors associated with patients at risk for suicide. (C-3)
- 5-10.7 Summarize components associated with agitated delirium. (C-3)
- 5-10.8 Describe the assessment of psychiatric/behavioral patients. (C-1)
- 5-10.9 Summarize management of psychiatric/behavioral patients. (C-3)
- 5-10.10 Justify the need for patient restraints. (C-3)
- 5-10.11 Recognize the importance of proper positioning for restrained patients. (C-2,3)
- 5-10.12 Discuss legal considerations involved with psychiatric emergencies. (C-3)
- 5-10.13 Discuss the considerations of age-related variations for pediatric and geriatric assessment and management. (C-1)

AFFECTIVE OBJECTIVES

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

- 5-10.14 Explain the rationale for learning how to safely approach and manage a patient with a psychiatric emergency. (A-3)

PSYCHOMOTOR OBJECTIVES

No psychomotor objectives identified.

PRESENTATION

Declarative (What)

- I. Introduction/Definitions
 - A. Epidemiology - The National Institute of Mental Health (NIMH) documents that in any given year over 25 percent of adult Americans may suffer from a diagnosable mental disorder.
 - B. Behavior - manner in which a person acts or performs; any or all activities of a person, including physical and mental activity.

- C. Behavioral emergency/**psychological crisis**– display of abnormal behavior within a given situation that is due to extremes of emotion; this may lead to behavior that is unacceptable or intolerable to society.
 - D. Behavioral change - factors that may alter a patient's behavior:
 - 1. Situational stresses
 - 2. Medical/trauma
 - a. Low blood sugar
 - b. Lack of oxygen
 - c. Inadequate blood flow to the brain
 - d. Head trauma
 - e. Mind altering substances
 - f. Excessive cold/excessive heat
 - g. **Meningitis**
 - h. **Seizure disorders**
 - i. **Toxic exposure**
 - j. **Alcohol and other drugs – underdose/overdose**
 - E. **Psychiatric disorder - unusual behavior exhibited by the patient brought on by psychiatric conditions. Underlying causes include:**
 - 1. **Depression**
 - 2. **Anxiety/panic issues**
 - 3. **Schizophrenia**
 - 4. **Bipolar disorder**
 - 5. **Psychotic thinking**
- II. **Psychiatric emergencies**
- A. **Acute psychosis – acute onset, may occur without any current medical history of mental illness. May result from:**
 - 1. **Illness**
 - 2. **Infection**
 - 3. **High fever**
 - 4. **Use of legal/illegal medications/drugs or alcohol**
 - B. **Suicide risk - the EMT must recognize and intervene in self-destructive behavior before the patient attempts the act of suicide.**
 - 1. **Potential factors**
 - a. **Depression**
 - b. **Individuals over 40 (males over 55 at especially high risk) particularly single, widowed or divorced, alcoholic, and/or depressed**
 - c. **Previous history of self-destructive behavior**
 - d. **Recent diagnosis of serious illness (cancer, CHF)**
 - e. **Recent loss of significant loved one (loss could be separation/divorce)**
 - f. **Arrest, imprisonment, loss of job**
 - g. **Withdrawal from friends, family and society**
 - h. **History of trauma or abuse**
 - i. **Lack of social support and sense of isolation**
 - j. **Certain cultural and religious beliefs**

2. Signs and symptoms of patients at risk
 - a. A defined lethal plan of action which has been verbalized
 - b. Unusual gathering of articles which can cause death such as purchase of a gun, large volumes of pills
 - c. Patient feels life is meaningless
 - d. Anxiety, agitation, unable to sleep or sleeping all the time
 - e. Feeling trapped, no way out
 - f. Hopelessness
 - g. Anger and/or aggressive tendencies
 - h. Recklessness or engaging in risky activities
 - i. Dramatic mood changes
- C. Agitated delirium (excited delirium)
 1. Definition – a condition of impaired cognitive function resulting in socially unacceptable behavior
 2. Differentiated from ordinary agitation by its threat to the safety of emergency responders, bystanders and the patient
 3. Signs and symptoms
 - a. Disorientation
 - b. Hallucinations
 - c. Delusions
 - d. Bizarre and/or aggressive behavior
 - e. Shouting
 - f. Paranoia
 - g. Panic
 - h. Violence toward others
 - i. Insensitivity to pain
 - j. Super-human strength
 - k. Hyperthermia
 - l. Tachycardia
 - m. Hypertension
 - n. Diaphoresis
 - o. Dilated pupils
- III. Assessment components of psychiatric/behavioral patients
 - A. Perform scene-size up (special consideration toward presence of weapons, self-inflicted injuries)
 - B. Perform primary and secondary assessment with an emphasis on intellectual functioning and orientation
 1. Memory
 2. Concentration
 3. Judgment
 4. Thought content
 - a. Disordered thoughts
 - b. Delusions
 - c. Hallucinations
 - d. Unusual worries or fears
 5. Language

- a. **Speech pattern and content**
 - b. **Garbled or unintelligent**
 6. **Mood**
 - a. **Anxiety, depression, elation, agitation**
 - b. **Level of alertness, distractibility**
 - c. **Appearance, hygiene, dress**
 - d. **Psychomotor activity (posture, gait)**
 - C. **History-taking**
 1. Does the patient appear to be depressed?
 2. Is the patient a threat to self or others?
 3. Is there an underlying medical problem?
 4. Does the patient suggest methods of suicide?
 5. Is the patient unable to talk about the future?
- IV. **Management of psychiatric/behavioral patients**
 - A. Maintain a safe distance; allow for egress
 - B. **Establish rapport**
 1. **Utilize therapeutic interviewing techniques**
 2. Do not "play along" with visual or auditory disturbances
 3. **Be supportive and empathetic**
 4. **Limit interruptions**
 5. **Respect patient's personal space, limit physical contact**
 6. Attempt to calm the patient
 7. Approach slowly and purposefully
 8. **Avoid threatening actions, statements and questions**
 - C. Do not leave patient unattended; consider safekeeping of personal belongings
- V. On-scene time may be extended
 - A. Consider restraints - restraint should be avoided unless patient is a danger to self and/or others
 1. Request law enforcement
 2. Request ALS for usage of chemical restraint, if available
 3. If restraints must be used:
 4. Plan for adequate assistance to include 1 person for each extremity
 5. Act decisively
 6. Secure limbs with equipment approved per local protocol
 7. Rigid restraints, such as metal handcuffs, should only be applied by law enforcement officers, who should remain with patient
 8. Continually reassess CMS
 9. Do not hobble or hog-tie any patients.
 10. Continue therapeutic communication throughout process
 11. Documentation
 - a. Reason for restraints
 - b. Time applied
 - c. Method
 - d. Patient position
 - B. Patient's position should in no way compromise breathing or circulation

- C. Do not transport patients in a prone position due to risk of positional asphyxia
 - D. Cover patient's face with mask if spitting
 - E. Transport drugs and empty containers
- VI. Legal Considerations
- A. Consenting patients reduce liability
 - B. Non-consenting patients resisting treatment
 - 1. May require use of emergency detention statutes
 - 2. To provide care against patient's will, you must show a reasonable belief the patient would harm himself or others
 - 3. Law enforcement is required
 - C. Avoiding unreasonable force
 - 1. Use only the force necessary to keep patient from injuring himself or others
 - 2. Reasonable force is determined by considering:
 - a. Patient's size and strength
 - b. Abnormal behavior
 - c. Gender
 - d. Mental status
 - e. Method of restraint
 - 3. Expect the unexpected
 - D. Law enforcement and medical direction involvement is a necessity
 - E. Protection/safe guards against false accusations
 - 1. Documentation
 - 2. Potential for legal ramifications may be minimized by having:
 - a. Adequate personnel
 - b. Same gender attendants
 - c. Third party witnesses
- VII. Consider Age-Related variations for Pediatric and Geriatric Assessment and Management
- A. Pediatric Behavioral Emergencies
 - 1. Teen suicide concerns
 - 2. Aggressive behavior may be a symptom of an underlying disorder or disability
 - B. Geriatrics- suicide issues/depression common

MODULE 5

Medical

Lesson 5-11

Obstetrics and Gynecology

OBJECTIVES

OBJECTIVES LEGEND

C=Cognitive P=Psychomotor A=Affective

1 = Knowledge level

2 = Application level

3 = Problem-solving level

COGNITIVE OBJECTIVES

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

- 5-11.1 Define terms associated with female reproductive anatomy. (C-1)
- 5-11.2 Define terms associated with the process of labor. (C-1)
- 5-11.3 Discuss cultural values affecting pregnancy. (C-3)
- 5-11.4 Identify special considerations of adolescent pregnancy. (C-1)
- 5-11.5 Summarize the normal physiology of pregnancy. (C-3)
- 5-11.6 List and describe signs and stages of labor. (C-1)
- 5-11.7 List components of assessment for an obstetrical patient. (C-1)
- 5-11.8 Identify the contents of an obstetrics kit. (C-1)
- 5-11.9 State indications of an imminent delivery. (C-1)
- 5-11.10 List steps for a normal delivery. (C-1)
- 5-11.11 Discuss initial care of the newborn. (C-3)
- 5-11.12 Summarize neonatal resuscitation procedures. (C-1)
- 5-11.13 Describe complications of pregnancy, labor, delivery and postpartum. (C-1)
- 5-11.14 Discuss gynecological emergencies. (C-3)
- 5-11.15 Describe the age-related variations for pediatric and geriatric assessment and management of the female patient. (C-1)

AFFECTIVE OBJECTIVES

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

- 5-11.16 Appreciate the emotions that a sexual assault victim may be experiencing. (A-1)

PSYCHOMOTOR OBJECTIVES

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

- 5-11.17 Demonstrate the steps to assist in the normal delivery. (P-1,2)
- 5-11.18 Demonstrate the steps to assist in complicated deliveries. (P-1,2)
- 5-11.19 Demonstrate infant neonatal procedures. (P-1,2)
- 5-11.20 Demonstrate post delivery care of infant. (P-1,2)
- 5-11.21 Demonstrate the post-delivery care of the mother. (P-1,2)
- 5-11.22 Demonstrate the steps in management of the mother with excessive bleeding. (P-1,2)
- 5-11.23 Demonstrate completing a prehospital care report for patients with obstetrical/gynecological emergencies. (P-2)

PRESENTATION

Declarative (What)

- I. Female reproductive introduction and definitions
 - A. External genitalia – Perineum, labia minora, labia majora, urethra
 - B. Fetus - developing unborn baby
 - C. Uterus - organ in which a fetus grows, responsible for labor and expulsion of infant
 - D. Ovaries- primary sex glands located on each side of the uterus; excrete hormones and develop and release eggs that are needed for reproduction
 - E. Cervix- opening between uterus and vagina that dilates during stage one of labor
 - F. Birth canal - vagina and lower part of the uterus
 - G. Placenta - fetal organ through which fetus exchanges nourishment and waste products during pregnancy
 - H. Umbilical cord - cord which is an extension of the placenta through which fetus receives nourishment while in the uterus
 - I. Amniotic sac - the sac that surrounds the fetus inside the uterus; filled with amniotic fluid
 - J. Vagina - lower part of the birth canal
 - K. Crowning - the bulging-out of the vagina which is opening as the fetus' head or presenting part presses against it
 - L. "Bloody Show" - mucus and blood that may come out of the vagina as labor begins
 - M. Labor - the time and process (defined in 3 or 4 stages) beginning with the first uterine muscle contraction until delivery of the placenta
 - 1. Delivery is imminent
 - 2. Crowning
 - 3. In the process of delivering
 - N. Presenting part - the part of the infant/fetus that comes first - usually the head
 - O. Spontaneous abortion (miscarriage) - delivery of products of conception early in pregnancy
- II. Cultural values affecting pregnancy – may affect patient management – e.g. EMT gender, psychosocial factors
- III. Special considerations of adolescent pregnancy – physical and psychological maturity and development, separation of patient and parent, denial
- IV. Physiology
 - A. Normal changes in pregnancy
 - 1. Reproductive system – hormone levels increase to support fetal development
 - 2. Respiratory system – increase oxygen demand and consumption; increase respiratory rate and decreased minute volume; size of developing fetus applies pressure on diaphragm
 - 3. Cardiovascular system – increase in blood volume, increase heart rate; pressure of fetus on vena cava; changes in clotting factor

4. Musculoskeletal system – center of gravity changes with weight of fetus; joints loosen and become less stable
5. Gastrointestinal system - digestion slows causing increased nausea and vomiting
- B. Conception and fetal development
 1. Ovulation
 2. Fertilization
 3. Implantation
 4. Embryonic stage
 5. Fetal stage
- V. General system physiology, assessment and management
 - A. Signs of labor
 1. Lightening – sensation of pressure caused by descent of uterus into the pelvic cavity
 2. Braxton Hicks – false contractions
 3. Cervical dilation
 4. Bloody show
 5. Rupture membranes
 - B. Stages of labor and delivery
 1. First stage – onset of contractions, completing with full dilation of cervix
 2. Second stage
 - a. Birth
 - b. Positional changes of the fetus
 3. Third stage
 - a. Placental separation
 - b. Placental delivery
 - C. Patient assessment
 1. Airway, breathing, circulation
 2. SAMPLE history
 3. Vital Signs
 4. Obstetrical history – date of last menses, due date, confirmation of pregnancy, prenatal care, alcohol/drug use, complications with previous childbirths, number of previous pregnancies
 5. Physical examination
 - a. Fetal movement
 - b. Inspect for crowning, presenting parts, bleeding
- VI. Contents of a childbirth delivery kit
 - A. Surgical scissors/scalpel
 - B. Hemostats or cord clamps
 - C. Umbilical tape or sterilized cord
 - D. Bulb syringe
 - E. Towels
 - F. 2 x 10 gauze sponges
 - G. Sterile gloves
 - H. One baby blanket

- I. Sanitary napkins
- J. Plastic bag
- VII. Normal Delivery
 - A. Predelivery considerations
 - 1. Transport decision - it is best to transport an expecting mother, unless delivery is imminent.
 - 2. Questions
 - a. Are there contractions or pain?
 - b. What is the frequency and duration of contractions?
 - c. Any bleeding or discharge?
 - d. Does she feel the need to push?
 - e. Is crowning occurring with contractions?
 - f. Does she feel as if she is having a bowel movement with increasing pressure in the vaginal area?
 - 3. Precautions
 - a. Do not let the mother go to bathroom
 - b. Do not hold mother's legs together
 - B. Delivery procedures
 - 1. Utilize standard precautions
 - 2. Administer oxygen
 - 3. Have mother lie with knees drawn up and spread apart
 - 4. Elevate buttocks - with blankets or pillow
 - 5. Create sterile field around vaginal opening with sterile towels or paper barriers
 - 6. When the infant's head appears, place fingers on bony part of skull, exerting gentle pressure to prevent explosive delivery
 - 7. If the amniotic sac has not ruptured, use your fingers or clamp to puncture the sac and push it away from the infant's head and mouth
 - 8. Determine if the umbilical cord is around the infant's neck; slip over the shoulder or clamp, cut and unwrap
 - 9. After the infant's head has emerged, support the head and suction the mouth, then nostrils. (Use caution to avoid contact with the back of the mouth.)
 - 10. Guide head downward to facilitate delivery of the upper shoulder, then elevate head to facilitate delivery of the lower shoulder
 - 11. As the torso and body emerge, support the infant with both hands, keeping infant level or lower than the vagina
 - 12. Wipe blood and mucus from mouth and nose with gauze, suction mouth and nose as needed
 - 13. Wrap infant in a warm blanket and place on its side, head slightly lower than trunk
 - 14. When pulsation ceases, clamp cord in two places, cut between the clamps
 - 15. Observe for delivery of placenta while preparing for transport.

16. When delivered, wrap placenta in towel and put in plastic bag; transport with mother
 17. Place sterile pad over vaginal opening
 18. Record time of delivery and transport mother, infant and placenta to hospital
 19. Recognize that multiple patients now exist
 20. Vaginal bleeding following delivery - 500 mL blood loss is normal following delivery.
 21. Excessive blood loss may require elevation of pelvis, breast feeding and/or external uterine massage
 22. Treat for shock if signs/symptoms present
- C. Initial care of the newborn
1. Position, dry, wipe, and wrap newborn in blanket and cover the head
 2. Repeat suctioning
 3. Assessment of infant – APGAR scoring (1 and 5 minute intervals).
Normal APGAR
 - a. Appearance - color: no central (trunk) cyanosis
 - b. Pulse - greater than 100/min
 - c. Grimace - vigorous and crying
 - d. Activity - good motion in extremities
 - e. Breathing effort - normal, crying
 4. Stimulate newborn if not breathing
 - a. Flick soles of feet
 - b. Rub infant's back
- D. Resuscitation of the newborn follows the inverted pyramid - after assessment, if signs and symptoms require either cardiac or pulmonary resuscitation:
1. Inverted pyramid of neonatal resuscitation
 - a. Drying, warming, positioning, suction, tactile stimulation
 - b. Oxygen
 - c. BVM
 - d. Chest compressions
 2. Breathing effort - if shallow, slow or absent provide artificial ventilations:
 - a. 40-60/min
 - b. Reassess after 30 seconds
 - c. If no improvement, continue artificial ventilations and reassessments
 3. Heart rate
 - a. If less than 100 beats/minute provide artificial ventilations:
 - (1) 40-60/min
 - (2) Reassess after 30 seconds
 - (3) If no improvement continue artificial ventilations and reassessments

- b. If less than 60 beats/minute, start compressions (at rate of 120/minute, at 3:1 ratio) and artificial ventilations
4. Color - if central cyanosis is present with spontaneous breathing and an adequate heart rate administer free flow oxygen - administer oxygen (10-15L) using oxygen tubing held as close as possible to the newborn's face

VIII. Complications of Pregnancy

- A. Abuse
- B. Substance Abuse – fetal alcohol syndrome
- C. Diabetes Mellitus
- D. Bleeding (hemorrhage)
 1. Abortion
 - a. Elective abortion
 - b. Spontaneous abortion (miscarriage)
 2. Ectopic pregnancy – when fertilized egg attached anywhere outside of the uterus
- E. Supine hypotensive syndrome – supine positioning compresses the inferior vena cava reducing return of blood flow to the heart; reduces cardiac output and drops blood pressure; results in syncopal episodes. Recommendation for mother to lie on left side.
- F. Dehydration due to hyperemesis (morning sickness)
- G. Placental problems
 1. Abruptio placenta – when placenta separates from the uterine wall, resulting in hemorrhage
 2. Placenta previa – placenta forms abnormally low in uterus, fully or partially covering the cervix
- H. Hypertensive disorders
 1. Pregnancy-induced hypertension
 2. Preeclampsia – hypertension and fluid retention brought on by pregnancy
 3. Eclampsia – seizures resulting from preeclampsia
- I. High-risk pregnancy
 1. Premature labor and birth – prior to 36 weeks of gestation
 2. Post-term pregnancy – prolonged pregnancy past 40 weeks
 3. Meconium- amniotic fluid that is greenish or brownish-yellow rather than clear; an indication of possible fetal distress during labor
 - a. Do not stimulate infant prior suctioning
 - b. Suction
 - c. Maintain airway
 - d. Rapid transport
 - e. ALS intercept
 4. Multiple gestation
 - a. Be prepared for more than one resuscitation
 - b. Mutual aid/ALS intercept
 5. Intrauterine fetal death – “still born” or fetal demise
- J. Complications of labor

1. Premature rupture of membranes
2. Preterm labor
- K. Complications of delivery
 1. Breech birth presentation- breech presentation occurs when the buttocks or lower extremities are low in the uterus and will be the first part of the fetus delivered
 - a. Newborn at great risk for delivery trauma, prolapsed cord more common, transport immediately
 - b. Delivery does not occur within 10 minutes
 - c. Management
 - (1) Immediate rapid transport
 - (2) Oxygen
 - (3) Place mother in head down position with pelvis elevated
 2. Limb presentation- occurs when a limb of the infant protrudes from the birth canal; more commonly a foot when infant is in breech presentation
 - a. Immediate rapid transport upon recognition
 - b. Place mother on oxygen
 - c. Place mother in head down position with pelvis elevated
 3. Shoulder dystocia- occurs when infant's shoulders get stuck in the birth canal but the head was delivered.
 - a. Immediate rapid transport
 - b. Place the mother on oxygen
 - c. Support infant's airway
 - d. Keep pressure off the umbilical cord
 4. Nuchal cord – cord wound tightly around infants neck, potentially life-threatening
 5. Prolapsed cord - condition where the cord presents through the birth canal before delivery of the head; presents a serious emergency which endangers the life of the unborn fetus
 - a. Position mother with head down or buttocks raised using gravity to lessen pressure in birth canal
 - b. Insert sterile gloved hand into vagina pushing the presenting part of the fetus away from the pulsating cord
 - c. Rapidly transport, keeping pressure on presenting part and monitoring pulsations in the cord
- L. Postpartum complications – occur after delivery
 1. Hemorrhage
 - a. Early – within 24 hours
 - b. Late – between 24 hours to 6 weeks
 2. Increase risk of embolism
- IX. Gynecological emergencies
 - A. Sexually transmitted diseases (STD) and pelvic inflammatory disease (PID)
 1. Assessment findings

- a. Abdominal/vaginal pain
- b. Vaginal bleeding
- c. Vaginal discharge
- d. Fever
- e. Nausea/vomiting
- 2. Patient management
 - a. Protect privacy and modesty
 - b. Communication techniques
 - c. Supportive care
 - d. Transport in position of comfort
- B. Alleged sexual assault - criminal assault situations
 - 1. Patient management:
 - a. Standard precautions
 - b. Portray a non-judgmental attitude
 - c. Reassure patient of their safety
 - d. Law enforcement intervention
 - e. Crime scene protection
 - (1) Minimize contamination of crime scene
 - (2) Attempt to preserve evidence
 - (3) Minimize number of rescue personnel entering the scene
 - (4) Maintain "chain of evidence"
 - f. Evidence preservation – discourage patient from:
 - (1) Bathing
 - (2) Voiding or defecating
 - (3) Cleaning wounds
 - (4) Drinking fluids or brushing teeth. If patient insists on brushing teeth, have them chew on gauze first and preserve by placing in a paper bag.
 - (5) Changing clothes. If patient absolutely insists on changing clothes, have them stand on a clean or sterile sheet to undress. Save sheet and patient's clothing in a paper bag.
 - g. Examine genitalia only if profuse bleeding present
 - h. Manage injuries
 - i. Use same gender EMT for care when possible
 - j. Follow crime reporting requirements
 - k. Transport to facility with specialized training in assault
- X. Age-related variations for pediatric and geriatric assessment and management of the female patient
 - A. Pediatrics- Menarche (first menses) causes bleeding
 - B. Geriatrics- Menopausal women can become pregnant

MODULE 5

Medical

Lesson 5-12

Practical Lab: Medical

OBJECTIVES

OBJECTIVES LEGEND

C=Cognitive P=Psychomotor A=Affective

1 = Knowledge level

2 = Application level

3 = Problem-solving level

COGNITIVE OBJECTIVES

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

Demonstrate the cognitive objectives of Lesson 5-1: Medical Overview

Demonstrate the cognitive objectives of Lesson 5-2: Pharmacology and Medication Administration

Demonstrate the cognitive objectives of Lesson 5-3: Respiratory Emergencies

Demonstrate the cognitive objectives of Lesson 5-4: Cardiac Emergencies

Demonstrate the cognitive objectives of Lesson 5-5: Hematology

Demonstrate the cognitive objectives of Lesson 5-6: Abdominal and Gastrointestinal Disorders, Genitourinary/Renal

Demonstrate the cognitive objectives of Lesson 5-7: Neurology and Endocrine Disorders

Demonstrate the cognitive objectives of Lesson 5-8: Immunology

Demonstrate the cognitive objectives of Lesson 5-9: Toxicology

Demonstrate the cognitive objectives of Lesson 5-10: Psychiatric

Demonstrate the cognitive objectives of Lesson 5-11: Obstetrics and Gynecology

AFFECTIVE OBJECTIVES

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

Demonstrate the affective objectives of Lesson 5-1: Medical Overview

Demonstrate the affective objectives of Lesson 5-2: Pharmacology and Medication Administration

Demonstrate the affective objectives of Lesson 5-3: Respiratory Emergencies

Demonstrate the affective objectives of Lesson 5-4: Cardiac Emergencies

Demonstrate the affective objectives of Lesson 5-5: Hematology

Demonstrate the affective objectives of Lesson 5-6: Abdominal and Gastrointestinal Disorders, Genitourinary/Renal

Demonstrate the affective objectives of Lesson 5-7: Neurology and Endocrine Disorders

Demonstrate the affective objectives of Lesson 5-8: Immunology

Demonstrate the affective objectives of Lesson 5-9: Toxicology

Demonstrate the affective objectives of Lesson 5-10: Psychiatric

Demonstrate the affective objectives of Lesson 5-11: Obstetrics and Gynecology

PSYCHOMOTOR OBJECTIVES

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

Demonstrate the psychomotor objectives of Lesson 5-1: Medical Overview
Demonstrate the psychomotor objectives of Lesson 5-2: Pharmacology and Medication Administration
Demonstrate the psychomotor objectives of Lesson 5-3: Respiratory Emergencies
Demonstrate the psychomotor objectives of Lesson 5-4: Cardiac Emergencies
Demonstrate the psychomotor objectives of Lesson 5-5: Hematology
Demonstrate the psychomotor objectives of Lesson 5-6: Abdominal and Gastrointestinal Disorders, Genitourinary/Renal
Demonstrate the psychomotor objectives of Lesson 5-7: Neurology and Endocrine Disorders
Demonstrate the psychomotor objectives of Lesson 5-8: Immunology
Demonstrate the psychomotor objectives of Lesson 5-9: Toxicology
Demonstrate the psychomotor objectives of Lesson 5-10: Psychiatric
Demonstrate the psychomotor objectives of Lesson 5-11: Obstetrics and Gynecology

MODULE 5

Medical

Lesson 5-13

Evaluation: Medical

OBJECTIVES

OBJECTIVES LEGEND

C=Cognitive P=Psychomotor A=Affective

1 = Knowledge level

2 = Application level

3 = Problem-solving level

COGNITIVE OBJECTIVES

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

Demonstrate knowledge of the cognitive objectives of Lesson 5-1: Medical Overview

Demonstrate knowledge of the cognitive objectives of Lesson 5-2: Pharmacology and Medication Administration

Demonstrate knowledge of the cognitive objectives of Lesson 5-3: Respiratory Emergencies

Demonstrate knowledge of the cognitive objectives of Lesson 5-4: Cardiac Emergencies

Demonstrate knowledge of the cognitive objectives of Lesson 5-5: Hematology

Demonstrate knowledge of the cognitive objectives of Lesson 5-6: Abdominal and Gastrointestinal Disorders, Genitourinary/Renal

Demonstrate knowledge of the cognitive objectives of Lesson 5-7: Neurology and Endocrine Disorders

Demonstrate knowledge of the cognitive objectives of Lesson 5-8: Immunology

Demonstrate knowledge of the cognitive objectives of Lesson 5-9: Toxicology

Demonstrate knowledge of the cognitive objectives of Lesson 5-10: Psychiatric

Demonstrate knowledge of the cognitive objectives of lesson 5-11: Obstetrics and Gynecology

AFFECTIVE OBJECTIVES

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

Demonstrate knowledge of the affective objectives of Lesson 5-1: Medical Overview

Demonstrate knowledge of the affective objectives of Lesson 5-2: Pharmacology and Medication Administration

Demonstrate knowledge of the affective objectives of Lesson 5-3: Respiratory Emergencies

Demonstrate knowledge of the affective objectives of Lesson 5-4: Cardiac Emergencies

Demonstrate knowledge of the affective objectives of Lesson 5-5: Hematology

Demonstrate knowledge of the affective objectives of Lesson 5-6: Abdominal and Gastrointestinal Disorders, Genitourinary/Renal

Demonstrate knowledge of the affective objectives of Lesson 5-7: Neurology and Endocrine Disorders

Demonstrate knowledge of the affective objectives of Lesson 5-8: Immunology
Demonstrate knowledge of the affective objectives of Lesson 5-9: Toxicology
Demonstrate knowledge of the affective objectives of Lesson 5-10: Psychiatric
Demonstrate knowledge of the affective objectives of lesson 5-11: Obstetrics and
Gynecology

PSYCHOMOTOR OBJECTIVES

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

Demonstrate knowledge of the psychomotor objectives of Lesson 5-1: Medical
Overview
Demonstrate knowledge of the psychomotor objectives of Lesson 5-2:
Pharmacology and Medication Administration
Demonstrate knowledge of the psychomotor objectives of Lesson 5-3:
Respiratory Emergencies
Demonstrate knowledge of the psychomotor objectives of Lesson 5-4: Cardiac
Emergencies
Demonstrate knowledge of the psychomotor objectives of Lesson 5-5:
Hematology
Demonstrate knowledge of the psychomotor objectives of Lesson 5-6: Abdominal
and Gastrointestinal Disorders, Genitourinary/Renal
Demonstrate knowledge of the psychomotor objectives of Lesson 5-7: Neurology
and Endocrine Disorders
Demonstrate knowledge of the psychomotor objectives of Lesson 5-8:
Immunology
Demonstrate knowledge of the psychomotor objectives of Lesson 5-9: Toxicology
Demonstrate knowledge of the psychomotor objectives of Lesson 5-10:
Psychiatric
Demonstrate knowledge of the psychomotor objectives of lesson 5-11: Obstetrics
and Gynecology

MODULE 6

Trauma

Lesson 6-1

Trauma Overview

OBJECTIVES

OBJECTIVES LEGEND

C=Cognitive P=Psychomotor A=Affective

1 = Knowledge level

2 = Application level

3 = Problem-solving level

COGNITIVE OBJECTIVES

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

- 6-1.1 Define kinematics of trauma. (C-1)
- 6-1.2 Discuss various traumatic injury patterns and their predictability (C-2)
- 6-1.3 Identify the three phases of a collision. (C-2)
- 6-1.4 Discuss specific injuries related to multi-system trauma (C-1)
- 6-1.5 Discuss identification and categorization of trauma patients (C-2)
- 6-1.6 Discuss the Golden Hour (Period) (C-1)
- 6-1.7 Describe key components of the trauma patient assessment. (C-2)
- 6-1.8 List significant mechanisms of injury. (C-1)
- 6-1.9 Discuss trauma scoring. (C-3)
- 6-1.10 Discuss management of the trauma patient (C-2)
- 6-1.11 Differentiate between injury patterns seen in adults and pediatrics. (C-2)
- 6-1.12 Describe the injury patterns and causes of trauma in geriatric patients. (C-1)
- 6-1.13 Discuss risk factors that make geriatric patients prone to injuries due to falls. (C-1)
- 6-1.14 Explain the importance of fall prevention in geriatric patients. (C-1)

AFFECTIVE OBJECTIVES

- 6-1.15 Appreciates the importance of recognizing significant mechanisms of injury early in the assessment process. (A-1)

PSYCHOMOTOR OBJECTIVES

No psychomotor objectives identified.

PRESENTATION

Declarative (What)

- I. Kinematics of trauma
 - A. Definition –the transfer/conversion of energy resulting in traumatic injury
 - 1. Kinetic energy – the energy of a moving object; function of mass (weight) and velocity (speed) – speed being the most important factor
 - B. Traumatic Injury Patterns

1. **Blunt trauma**
 - a. **Three phases of a collision (transfer of energy)**
 - (1) Vehicle collides with object (e.g. tree or other vehicle)
 - (2) Passenger impacts with interior of vehicle/objects inside vehicle
 - (3) Internal organs collide against solid structures of the body
 - b. Vehicle occupants can sustain multi-system trauma due to multiple collisions of the body and internal organs (not wearing seatbelts increases the risk of occurrence)
 - c. **Direction of the force has influence on injury type**
 - (1) Frontal impacts
 - (2) Rear impacts
 - (3) Side impacts
 - (4) Rotational impacts
 - (5) Rollovers
2. **Deceleration injuries occur when a patient strikes a large immovable mass (vehicle, ground, pillar)**
3. **Penetrating trauma**
 - a. **Damage is influenced by**
 - (1) Distance from shooter
 - (2) Size/type of bullet
 - (3) Fragmentation
 - (4) Cavitation
 - (5) Velocity of weapon
 - b. **Effects on energy levels**
 - (1) Low energy (stabbings)
 - (2) Medium energy (handguns, some rifles)
 - (3) High energy (military weapons)
4. **Blast injuries**
 - a. **Types of Blast Injuries (explosions)**
 - (1) **Release**
 - (a) Blast waves
 - (b) Blast winds
 - (c) Ground shock
 - (d) Heat
 - b. **Pathophysiology**
 - (1) Blast waves cause disruption of major blood vessels, rupture of major organs, and lethal cardiac disturbances when the victim is close to the blast
 - (2) Blast winds and ground shock can collapse buildings and cause trauma
 - c. **Signs and Symptoms – expect multi-system trauma inclusive of all organs and systems**
 - (1) Respiratory distress/compromised system
 - (2) Cardiovascular damage/compromised system

- (3) Central nervous system compromise (traumatic brain injury [TBI] and spinal cord injury)
 - (4) Hearing damage
 - (5) Damage to vital organs
 - (6) Orthopedic
 - (7) Soft tissue
 - d. Management considerations in blast injuries
 - (1) Multi-system trauma care
 - (2) Immediate transport
 - (3) Multi-casualty care (triage)
 - C. Predictability of injury patterns
 - 1. View trauma scenes and attempt to predict what injury patterns might have resulted based upon an evaluation of kinetic energy
 - 2. Index of suspicion – an awareness of the potential for severe underlying injuries to occur
 - 3. Signs and symptoms will vary depending upon the organ struck/damaged
 - a. Head
 - b. Neck
 - c. Chest
 - d. Abdomen
 - e. Pelvis
 - f. Extremities
- II. Identification and categorization of Trauma Patients
 - A. 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.
- III. The Golden Hour (Period) – duration of time from injury to definitive care
- IV. Assessment of the Trauma Patient
 - A. Key Components of the Trauma Patient Assessment
 - 1. Scene size-up
 - a. Standard precautions
 - b. Scene safety
 - c. MOI
 - d. Additional resources
 - 2. Primary assessment
 - a. General impression
 - b. Mental Status
 - c. ABCs
 - d. Priority and transport decision
 - 3. History Taking
 - 4. Secondary assessment
 - a. Vital signs

- b. Systematic physical exam based upon MOI
 - 5. Re-assessment
 - B. Mechanism of Injury (MOI)
 - 1. Significant MOI (including, but not limited to)
 - a. Multi-system trauma
 - b. Vehicle crashes with intrusion
 - c. Falls from significant heights
 - d. Pedestrian versus vehicle
 - e. Motorcycle crashes
 - f. Death of a vehicle occupant in the same vehicle
 - 2. Non-significant MOI (including, but not limited to)
 - a. Isolated trauma to a body part
 - b. Falls without loss of consciousness
 - 3. Pediatric considerations
 - a. (see pediatric section below)
 - 4. Re-evaluate MOI
 - 5. Special considerations
 - a. Consider application of spinal precautions
 - b. When practical, roll the supine patient on their side to allow for an assessment of the posterior body
 - c. Consider ALS backup
 - C. Trauma Scoring
 - 1. Glasgow Coma Score (GCS)
 - 2. Revised Trauma Score (RTS)
- V. Management of the Trauma Patient
 - A. Rapid transport and destination issues
 - 1. Scene time
 - 2. Air versus ground
 - B. Destination selection
 - C. Trauma system components
 - 1. Hospital categorizations
 - 2. Levels and qualifications
 - D. Expedite transport/consider ALS
- VI. Pediatric Considerations - Injury patterns associated with trauma
 - A. Injuries are the number one cause of death
 - B. Blunt injury is most common
 - 1. The pattern of injury will be different from adults
 - a. Motor vehicle crashes – **Speeds greater than 25 mph are considered medium-high speed collisions**
 - (1) Motor vehicle passengers
 - (a) Unrestrained passengers have head and neck injuries
 - (b) Restrained passengers have abdominal and lower spine injuries
 - (2) Struck while riding bicycle - head injury, spinal injury, abdominal injury

- (3) Pedestrian struck by vehicle - abdominal injury with internal bleeding, possible painful, swollen, deformed thigh, head injury
 - b. Falls from height, diving into shallow water - head and neck injuries
 - (1) Falls greater than 10ft. without loss of consciousness
 - (2) Falls less than 10ft. with loss of consciousness
 - c. Burns
 - d. Sports related injuries - head and neck
 - e. Child abuse and neglect
 - (1) Definition of abuse - improper or excessive action so as to injure or cause harm
 - (2) Definition of neglect - giving insufficient attention or respect to someone who has a claim to that attention
 - (3) EMT must be aware of condition to be able to recognize the problem
 - (4) Physical abuse and neglect are the two forms of child abuse that the EMT is likely to suspect
 - (5) Signs and symptoms of abuse
 - (a) Multiple bruises in various stages of healing
 - (b) Injury inconsistent with mechanism described
 - (c) Repeated calls to the same address
 - (d) Fresh burns
 - (e) Parents seem inappropriately unconcerned
 - (f) Conflicting stories
 - (g) Fear on the part of the child to discuss how the injury occurred
 - (6) Signs and symptoms of neglect
 - (a) Lack of adult supervision
 - (b) Malnourished appearing child
 - (c) Unsafe living environment
 - (d) Untreated chronic illness; e.g., asthmatic with no meds
 - (7) CNS injuries are the most lethal - shaken baby syndrome
 - (8) Do not accuse in the field
 - (a) Accusation and confrontation delays transportation.
 - (b) Bring objective information to the receiving facility
 - (9) Reporting required by state law
 - (a) Local regulations
 - (b) Objective - what you see and what you hear - NOT what you think
- C. Specific body systems concerns
- 1. Head

- a. The single most important maneuver is to assure an open airway by means of the modified jaw thrust
 - b. Children are likely to sustain head injury along with internal injuries. Signs and symptoms of shock with a head injury should cause you to be suspicious of other possible injuries.
 - c. Respiratory arrest is common secondary to head injuries and may occur during transport
 - d. Common signs and symptoms are nausea and vomiting
 - e. Most common cause of hypoxia in the unconscious head injury patient is the tongue obstructing the airway. Jaw-thrust is critically important.
 - f. Do not use sandbags to stabilize the head because the weight on child's head may cause injury if the board needs to be turned for emesis
2. Chest
 - a. Children have very soft pliable ribs
 - b. There may be significant injuries without external signs
 3. Abdomen
 - a. More common site of injury in children than adults
 - b. Often a source of hidden injury
 - c. Always consider abdominal injury in the multiple trauma patient who is deteriorating without external signs
 - d. Air in stomach can distend abdomen and interfere with artificial ventilation efforts
- VII. Geriatric considerations- injury patterns and causes of trauma in geriatric patients
- A. Leading causes of death include falls, motor vehicle collisions and burns
 - B. Physical injury resulting from elder abuse
 - C. Musculoskeletal system changes increase chance of injury
 1. Risk factors making older adults prone to injuries due to falls
 - a. Sensory impairment
 - b. Brain disease affecting balance
 - c. Dementia
 - d. Musculoskeletal disorders
 - e. Medications
 - f. Advanced age
 2. Fall prevention
 - a. Review medications
 - b. Improve sensory function
 - c. Eliminate environmental obstacles
 - d. Strength and balance exercises

MODULE 6

Trauma

Lesson 6-2

Bleeding

OBJECTIVES**OBJECTIVES LEGEND**

C=Cognitive P=Psychomotor A=Affective

1 = Knowledge level

2 = Application level

3 = Problem-solving level

COGNITIVE OBJECTIVES

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

- 6-2.1 Review the structures and function of the cardiovascular system. (C-1)
- 6-2.2 Review shock (hypoperfusion). (C-1)
- 6-2.3 Differentiate between types, origin and characteristics of various types of external bleeding. (C-1)
- 6-2.4 Identify the severity of blood loss due to external hemorrhage. (C-1)
- 6-2.5 Discuss assessment considerations relevant to bleeding. (C-2)
- 6-2.6 List the signs and symptoms associated with types of bleeding. (C-1)
- 6-2.7 Discuss management strategies of bleeding. (C-1)

AFFECTIVE OBJECTIVES

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

- 6-2.8 Explain the sense of urgency to transport patients that are bleeding and show signs of shock. (A-1)
- 6-2.9 Attend to the feelings of the family when dealing with a pediatric trauma patient. (A-1)
- 6-2.10 Understand the EMS provider's own emotional response to dealing with a pediatric trauma patient. (A-1)

PSYCHOMOTOR OBJECTIVES

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

- 6-2.11 Demonstrate various techniques involved with control of various types of bleeding. (P-2)
- 6-2.12 Demonstrate management steps for patients exhibiting signs and symptoms associated with bleeding. (P-1, 2)

PRESENTATION**Declarative (What)**

- I. Review anatomy and physiology of the cardiovascular system
- II. Review pathophysiology of shock
- III. Bleeding (hemorrhage)
 - A. Types of blood loss
 - 1. External
 - a. External bleeding - origin and characteristics

- (1) Arterial
 - (a) The blood spurts from the wound
 - (b) Bright, red, oxygen rich blood
 - (c) Arterial bleeding is the most difficult to control because of the pressure at which arteries bleed
 - (d) As the patient's blood pressure drops, the amount of spurting may also drop
 - (2) Venous
 - (a) The blood flows as a steady stream
 - (b) Dark, oxygen poor blood
 - (c) Bleeding from a vein can be profuse; however, in most cases it is easier to control due to the lower venous pressure
 - (3) Capillary
 - (a) The blood oozes from a capillary and is dark red in color
 - (b) The bleeding often clots spontaneously
- b. **Physiological response to bleeding**
- (1) **Clotting and clotting disorders**
 - (2) **Factors that affect clotting**
 - (a) **Movement of injured area**
 - (b) **Body temperature**
 - (c) **Medications**
 - (d) **Removal of bandages**
 - (3) **Localized vasoconstriction**
- c. **Severity**
- (1) Sudden loss of one liter (1000cc) of blood in the adult patient, 1/2 liter (500cc) of blood in the child, and 100 - 200cc of the blood volume in an infant is considered serious
 - (2) Severity based on signs, symptoms and general impression of the amount of blood loss
 - (3) Patient's exhibiting signs and symptoms of shock; blood loss is serious.
 - (4) Physiological response to bleeding includes vasoconstriction and clotting; serious injury may prevent effective clotting formation
 - (5) Uncontrolled bleeding or significant blood loss result in shock and ultimately death
- d. **Assessment considerations relevant to bleeding**
- (1) **Mechanism of injury**
 - (2) **Primary assessment**
 - (a) **Identify life threats**
 - (3) **Physical assessment findings**
 - (a) **Altered LOC**

- (b) Blood pressure is not a reliable indicator of early shock
- (c) Peripheral perfusion deficits
- (4) History – pre-existing illnesses
- (5) Pediatric considerations
 - (a) Vital signs variations
 - (b) Total fluid volume less than adults
- (6) Geriatric considerations
 - (a) Medications
 - (b) Physiological changes associated with the aging process
- e. Management of external bleeding
 - (1) Standard precautions
 - (2) Maintain airway/ and breathing
 - (3) Bleeding control
 - (a) Direct pressure
 - (b) Elevation, in conjunction with direct pressure
 - (c) Large gaping wounds may require packing with sterile gauze
 - (d) Add additional dressings over previously applied
 - (e) Pressure points (upper and lower extremities)
 - (4) Methods to control external bleeding if direct pressure fails
 - (a) Splints – reduces motion
 - (b) Pressure splints – circumferential pressure
 - (c) Pneumatic counterpressure devices
 - (d) Hemostatic agents – commercial devices used with approval of medical direction
 - (e) Tourniquet - Use to control bleeding of an amputated extremity when other methods of bleeding control have failed. Special precautions needed.
- f. Specific areas of external bleeding (nose, ears or mouth)
 - (1) Potential causes:
 - (a) Injured skull
 - (b) Facial trauma
 - (c) Digital trauma (nose picking)
 - (d) Sinusitis and other upper respiratory tract infections
 - (e) Hypertension (high blood pressure)
 - (f) Coagulation disorders
 - (2) Bleeding from the ears or nose may occur because of a skull fracture. Do not attempt to stop the blood flow.
 - (3) Management of epistaxis (nosebleed)
 - (a) Position patient leaning forward

- (b) Apply direct pressure for several minutes by pinching the fleshy portion of the nostrils together
 - (c) Keep the patient calm and quiet
2. Internal Bleeding
- a. Severity
 - (1) Internal bleeding can result in severe blood loss, shock and death
 - (2) Injured or damaged internal organs commonly lead to extensive bleeding
 - (3) Fractured extremities may lead to serious internal blood loss
 - (4) Severity of internal bleeding should be based on the mechanism of injury, high index of suspicion and clinical signs and symptoms
 - b. Maintain high index of suspicion in relationship to MOI (e.g. MVCs, significant falls, gunshot wounds)
 - c. Signs and symptoms
 - (1) Possible fractures
 - (2) Bleeding from body orifice (mouth, rectum, vagina)
 - (3) Vomiting bright red blood or dark coffee ground colored blood
 - (4) Dark, tarry stools or stools with bright red blood
 - (5) Tender, rigid, and/or distended abdomen
 - (6) Altered LOC, anxiety, restlessness
 - (7) Late signs and symptoms of hypovolemic shock
 - (a) Deteriorating LOC
 - (b) Weakness, faintness or dizziness
 - (c) Thirst
 - (d) Shallow rapid breathing
 - (e) Rapid weak pulse
 - (f) Pale, cool, clammy skin
 - (g) Capillary refill greater than 2 seconds (infants and child)
 - (h) Dropping blood pressure
 - (i) Slow to react or dilated pupils
 - (j) Nausea and vomiting
 - d. Management
 - (1) Standard precautions
 - (2) Maintain airway/breathing
 - (3) Oxygen administration
 - (4) Control external bleeding
 - (5) Expedite transport/consider ALS
 - (6) Maintain body temperature
 - (7) Provide psychological support

MODULE 6

Trauma

Lesson 6-3

Soft Tissue Injuries and Burns

External Injuries to the Head, Face and Neck

Injuries to the Chest, Abdomen and Genitalia

OBJECTIVES

OBJECTIVES LEGEND

C=Cognitive P=Psychomotor A=Affective

1 = Knowledge level

2 = Application level

3 = Problem-solving level

COGNITIVE OBJECTIVES

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

- 6.3.1 Discuss the mortality and morbidity of soft tissue injuries (C-1)
- 6-3.2 State the major functions of the skin. (C-1)
- 6-3.3 List the layers of the skin. (C-1)
- 6-3.4 List the types of soft tissue injuries. (C-1)
- 6-3.5 Discuss the generalized signs and symptoms of open soft tissue injuries. (C-2)
- 6-3.6 Discuss management of various soft tissue injuries. (C-1)
- 6-3.7 Discuss types, characteristics, classifications and severity of burns. (C-1)
- 6-3.8 Discuss complications of burn injuries. (C-1)
- 6-3.9 Discuss assessment and management of various burn injuries. (C-2)
- 6-3.10 Discuss the age-related variations for pediatric and geriatric patients regarding assessment and management of burn injuries. (C-2)
- 6-3.11 Review anatomy and physiology of the head, face and neck. (C-1)
- 6-3.12 Describe management of a patient with head, face and neck injuries. (C-2)
- 6-3.13 Review anatomy and physiology of the chest. (C-1)
- 6-3.14 Discuss the pathophysiology of chest trauma (C-2)
- 6-3.15 List types of chest injuries. (C-1)
- 6-3.16 Describe assessment findings and management of chest injuries (C-2)
- 6-3.17 Discuss the age-related variations for pediatric and geriatric patients regarding assessment and management of chest injuries. (C-2)
- 6-3.18 Review anatomy and physiology of the abdomen and genitalia. (C-2)
- 6-3.19 Provide examples of mechanisms of injury that cause abdominal and genitourinary injuries. (C-2)
- 6-3.20 List the signs and symptoms of abdominal and genitourinary injuries. (C-1)
- 6-3.21 Discuss the assessment and management of abdominal and genitourinary injuries. (C-2)
- 6-3.22 Discuss the age-related variations for pediatric and geriatric patients regarding assessment and management of abdominal and genitourinary injuries. (C-2)
- 6-3.23 Explain the proper use of various dressings and bandages (C-1)

AFFECTIVE OBJECTIVES

No affective objectives identified.

PSYCHOMOTOR OBJECTIVES

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

- 6-3.24 Demonstrate the steps in the management of various soft tissue injuries. (P-1,2)
- 6-3.25 Demonstrate the steps in the management of various types of burns. (P-1,2)
- 6-3.26 Demonstrate the steps in the management of an open chest wound. (P-1,2)
- 6-3.27 Demonstrate the steps in the management of various abdominal injuries. (P-1,2)
- 6-3.28 Demonstrate the steps in the management of an impaled object. (P-1,2)
- 6-3.29 Demonstrate the steps in the management of an amputation. (P-1,2)
- 6-3.30 Demonstrate a patient assessment for a patient who has sustained various traumatic injuries. (P-1, 2)
- 6-3.31 Demonstrate completing a prehospital care report for patients with soft tissue injuries. (P-2)

PRESENTATIONDeclarative (What)

- I. **Soft tissue injury, incidence of**
 - A. **Morbidity/mortality - often related to hemorrhage and/or infection; leading form of injury**
 - B. **Skin**
 - 1. Function – protection from environment, thermoregulation, sensory, and personal identify
 - 2. Layers and structures
 - a. Epidermis
 - b. Dermis
 - c. Subcutaneous tissue
 - d. Sebaceous glands
 - e. Sensory nerves
 - f. Blood vessels
 - g. Sweat glands, pores
 - h. Hair follicles, hair
 - C. **Types/categories of soft tissue injuries**
 - 1. **Closed**
 - a. **Types**
 - (1) **Contusion (bruise)**
 - (a) Epidermis remains intact
 - (b) Cells are damaged and blood vessels torn in the dermis
 - (c) Swelling and pain are typically present
 - (d) Blood accumulation causes discoloration
 - (2) **Hematoma**

- (a) Collection of blood beneath the skin
- (b) Larger amount of tissue damage as compared to contusion
- (c) Larger vessels are damaged
- (d) May lose one or more liters of blood
- (3) Crush injuries
 - (a) Crushing force applied to the body
 - (b) Can cause internal organ rupture
 - (c) Internal bleeding may be severe with shock (hypoperfusion)
- b. Management
 - (a) **Standard precautions**
 - (b) Management of airway, breathing
 - (c) Oxygen administration
 - (d) Maintain body temperature
 - (e) Elevate lower extremities per protocol
 - (f) Splint possible fractures
 - (g) Transport
- 2. Open
 - a. Types
 - (1) Abrasion
 - (a) Outermost layer of skin is damaged by shearing forces
 - (b) Painful, even though superficial
 - (c) Minimal blood loss, if small body surface area
 - (2) Laceration/**incision**
 - (a) Break in skin, varying depth
 - (b) May be linear (regular) or jagged (irregular)
 - (c) MOI - forceful impact with sharp object
 - (d) Bleeding may be severe
 - (3) Avulsion - flaps of skin or tissue are torn loose or pulled completely off
 - (a) Never remove skin flap regardless of size
 - (b) Complete avulsion often has serious infection concerns
 - (c) Attempt to reposition avulsion into correct anatomical position
 - (4) Bite
 - (a) Control hemorrhage
 - (b) Often lead to serious infection
 - (5) **Blast injury/high pressure**
 - (6) Penetration/puncture (including possible impaled object)
 - (a) Caused by sharp pointed object (stab wound, gunshot wound)
 - (b) Minimal external bleeding

- (c) Internal bleeding may be severe
 - (d) Exit wound may be present
 - (7) Amputation
 - (a) Involve extremities and other body parts (ear lobe, penis)
 - (b) Amount of blood loss vary with extent of injury
 - (i) Wrap in plastic and keep cool
 - (ii) Transport with patient
 - (iii) Wrap in a sterile dressing
 - (iv) Do not complete partial amputations
 - (v) Immobilize to prevent further injury
 - (8) Crush injury
 - (a) May result in damage to soft tissue and internal organs
 - (b) May cause fractures
 - (c) External bleeding may be minimal or absent
 - (d) Internal bleeding may be severe
 - D. Signs and symptoms, generalized
 - 1. Altered LOC
 - 2. Bleeding
 - 3. Bruising
 - 4. Deformity
 - 5. Tachycardia
 - 6. Cool, clammy skin
 - 7. Rapid respirations
 - 8. Pain
 - E. Management
 - 1. Monitor ABCs
 - 2. Manage life-threatening conditions first
 - 3. Oxygen administration
 - 4. Control bleeding
 - 5. Apply dressings and bandages
 - 6. Consider elevation of injured extremity
 - 7. Expedite transport/consider ALS
- II. **Burn injuries**
 - A. **Morbidity/mortality – account for significant death rate, are serious and painful injuries, and have potential for long-term disability**
 - B. Types of burns
 - 1. Thermal
 - a. Sources
 - (1) flame
 - (2) steam
 - (3) hot liquids
 - (4) scalds
 - (5) flash
 - (6) contact

- b. Severity related to
 - (1) Exposure time
 - (2) Temperature
 - c. Injury considerations
 - (1) Unusual history patterns may be abuse
 - (2) May be associated with inhalation injury
 - (3) Large burns may cause hypovolemia and hypothermia
2. **Inhalation**
- a. **Edema and airway obstruction likely due to rapid swelling**
 - (1) **Hoarseness**
 - (2) **Singed nasal or facial hair**
 - (3) **Burns of the face**
 - (4) **Carbon in sputum**
 - b. **Carbon monoxide inhalation**
 - c. **Enclosed space vs. open space**
 - d. **Injury considerations**
 - (1) **Complications are related to toxic chemicals within inhaled air**
 - (a) **Carbon monoxide**
 - (b) **Cyanide**
 - (c) **Carbon dioxide**
 - (2) **Consider ALS intercept**
3. **Chemical**
- a. **Sources**
 - (1) **Acids**
 - (2) **Bases**
 - (3) **Caustics**
 - b. **Severity related to**
 - (1) **Type of chemical**
 - (2) **Concentration**
 - (3) **Duration of exposure**
 - c. **Injury considerations**
 - (1) **Liquid chemicals – flush with water**
 - (2) **Dry powder chemicals need to be brushed off to remove chemical**
 - (3) **Chemical burn treatments can be specific to the burning agent - labels should be read**
 - (4) **Immediately begin to flush with large amounts of water if not contraindicated**
 - (5) **Continue flushing the contaminated area when en route**
 - (6) **Do not contaminate uninjured areas when flushing**
 - (7) **Burns that occur at an industrial sites may have expert resources available**
4. **Electrical**

- a. Sources
 - (1) Alternating current
 - (2) Direct current
 - (3) Lightening
 - b. Severity related to
 - (1) External burns may not indicate extent and severity of the burn
 - (2) May cause cardiac arrest, including lightening strikes
 - (3) The type of electric current, amperage and volts, have effect on seriousness of burns
 - c. Injury considerations
 - (1) If patient is still in contact with the electrical source, or you are unsure, do not touch the patient
 - (2) Entrance and exit wounds
 - (3) Electrical current can cross through the chest resulting in cardiac arrest or arrhythmias
 - (4) Underlying injuries to organs and the nervous system can occur
5. **Radiation**
- a. **Types**
 - (1) **Alpha**
 - (2) **Beta**
 - (3) **Gamma**
 - b. **Severity determination**
 - (1) **Exposure type**
 - (2) **Time**
 - (3) **Shielding**
 - (4) **Distance**
 - c. **Injury considerations**
 - (1) **Require special rescue techniques**
 - (2) **Decontamination**
- C. Depth of burn
- 1. Superficial (first-degree) – involves only the epidermis
 - a. Reddened skin (erythema)
 - b. Swelling
 - c. Pain
 - 2. Partial thickness (second-degree) - involves both the epidermis and the dermis, but does not involve underlying tissue
 - a. Intense pain
 - b. White to red skin that is moist and mottled
 - c. Blisters
 - d. Swelling
 - 3. Full thickness (third-degree) - burn extend through all the dermal layers and may involve subcutaneous layers, muscle, bone or organs

- a. Skin becomes dry and leathery and may appear white, dark brown or charred
 - b. Loss of sensation - little or no pain, hard to the touch, pain at periphery
- D. Severity
1. Depth/degree of the burn
 2. Agent/source
 3. Percentage of body surface area (BSA) burned - size of the patient's hand is equal to 1%
 - a. Rule of nines
 - (1) Adults
 - (a) Head and Neck 9%
 - (b) Each upper extremity - 9%
 - (c) Anterior trunk - 18%
 - (d) Posterior trunk - 18%
 - (e) Each lower extremity - 18%
 - (f) Genitalia – 1%
 - (2) Infant
 - (a) Head and neck - 18%
 - (b) Each upper extremity - 9%
 - (c) Anterior trunk - 18%
 - (d) Posterior trunk - 18%
 - (e) Each lower extremity - 14%
 4. Location of the burn
 - a. Face and upper airway
 - b. Hand
 - c. Feet
 - d. Genitalia
 5. Pre-existing medical conditions
 6. Age of the patient
 - a. Less than five years of age
 - b. Greater than fifty-five years of age
- E. Classification
1. Critical burns
 - a. Full thickness burns involving the hands, feet, face, or genitalia
 - b. Burns associated with respiratory injury
 - c. Full thickness burns covering more than 10% of BSA
 - d. Partial thickness burns covering more than 30% of BSA
 - e. Burns complicated by orthopedic injury
 - f. Moderate burns in young children or elderly patients
 - g. Circumferential burns
 2. Moderate burns
 - a. Full thickness burns of 2 to 10% of BSA excluding hands, feet, face, genitalia and upper airway
 - b. Partial thickness burns of 15 to 30% of BSA

- c. Superficial burns of greater than 50% of BSA
 3. Minor burns
 - a. Full thickness burns of less than 2% of BSA
 - b. Partial thickness burns of less than 15% of BSA
 - c. Superficial thickness burns of less than 50% of BSA
- F. Complications of burn injuries
 1. Infection
 2. Shock
 3. Hypoxia
 4. Airway obstruction
 5. Hypothermia
 6. Hypovolemia
 7. Complications of circumferential burns (pressure on vessels and nerves)
- G. Assessment considerations relevant to burns
 1. Scene safety
 2. Standard precautions
 3. Monitor airway for evidence of closure due to swelling (possibility of inhalation injury)
 4. Identify severity of burn by type, location, depth and percentage of BSA
 5. Assess for presence of entrance and exit wounds with electrical burns
- H. Generalized management
 1. Stop the burning process, initially with water or saline
 2. Remove smoldering clothing
 3. Remove constricting bands (jewelry)
 4. Airway and breathing
 5. Oxygen administration
 6. Monitor the patient closely for respiratory and cardiac arrest
 7. Position with head elevated if spine injury is not suspected
 8. Treat any secondary injuries
 9. Cover burn with a sterile dressing to prevent further contamination (refer to local protocol for wet versus dry dressing)
 10. Do not use any type of ointment, lotion or antiseptic
 11. Do not break blisters
 12. Prevent hypothermia
 13. Expedite transport/consider ALS
 14. Consider transport to specialized burn center
- I. Infant and child considerations
 1. Relative size
 - a. Greater surface area in relationship to the total body size
 - b. Results in greater fluid and heat loss
 - c. Any full thickness burn or partial thickness burn greater than 20%, or burn involving the hands, feet, face, airway or genitalia is considered to be critical

- d. Any partial thickness burn of 10 to 20% is considered moderate
- e. Any partial thickness burn less than 10% is considered minor
- 2. Higher risk for shock, airway problem or hypothermia
- 3. Consider possibility of child abuse
- J. Geriatric considerations
 - 1. Skin thins with age
 - 2. Dehydration
 - 3. Hypothermia
 - 4. Preexisting health issues
 - 5. Polypharmacy
 - 6. Diminished neurological function
- III. Head, face and neck – external injuries (spinal cord and brain injuries covered in lesson 6-5)
 - A. Review of anatomy and physiology
 - 1. Head, Face, and Neck
 - a. Arteries
 - b. Veins
 - c. Nerves
 - d. Bones
 - (1) Nasal
 - (2) Zygoma/zygomatic arch
 - (3) Orbital
 - (4) Maxilla
 - (5) Mandible
 - e. Skull
 - f. Scalp
 - (1) Hair
 - (2) Subcutaneous tissue
 - (3) Muscle
 - g. Mouth/Throat
 - (1) Airway
 - (a) Oropharynx
 - (b) Larynx
 - (c) Trachea
 - (d) Tongue
 - (e) Teeth
 - h. Neck
 - (1) Blood vessels
 - (a) Carotid arteries
 - (b) Jugular veins
 - (2) Airway – trachea
 - (3) Gastrointestinal – esophagus
 - i. Eye
 - (1) Bony orbit
 - (2) Sclera

- (3) Cornea
 - (4) Iris
 - (5) Pupil
 - (6) Lens
 - (7) Retina
 - (8) Optic nerve
- B. General assessment - head, face, and neck injuries
- 1. Scene Size-Up
 - 2. **Primary assessment**
 - a. Airway
 - b. Ventilation and oxygenation
 - c. Circulation
 - d. Disability
 - (1) Level of consciousness
 - (2) Motor/sensory response
 - (3) Pupils – anisocoria (unequal)
 - e. Expose
 - 3. Identify and manage life threats
- C. Specific injuries to head, face, and neck
- 1. Scalp
 - a. Types
 - (1) Open wounds (flap lacerations)
 - (2) Closed wounds
 - (3) Consider underlying injury (skull, brain)
 - b. Signs and Symptoms
 - (1) Open wounds bleed heavily
 - (2) Injuries above the ears may be more serious
 - (3) Battle's sign is a delayed finding of basal skull fracture
 - c. Management
 - (1) Apply pressure to control bleeding (direct pressure may be problematic due to underlying skull injury)
 - (2) Dressings and bandaging should not close the mouth
 - (3) Consider C-Spine
 - 2. Facial Injuries
 - a. Types
 - (1) Soft tissue
 - (2) Fractures of facial bones
 - (3) Eye trauma
 - (4) Oral/dental - tooth avulsion
 - (5) Mandibular fractures
 - (6) Maxillary fractures
 - b. Signs and Symptoms
 - (1) Swelling may be severe
 - (2) Facial bones may fracture causing airway and ventilation obstruction
 - (3) Eye injuries

- (a) Suffer soft tissue type injuries (abrasions, lacerations, punctures, chemical burns)
- (b) May cause vision disturbances
- (c) Excessive pressure on the eye may result in orbital fractures (“blow out”)
- (4) Nasal fractures may cause bleeding (compromising airway)
- (5) Oral injuries may cause airway management complications
- c. Assessment
 - (1) Inspect
 - (a) Open wounds
 - (b) Swelling
 - (c) Deformity of bones
 - (2) Palpate – facial bone alignment
 - (3) Eye clarity without foreign objects
 - (4) Eye symmetry
 - (5) Eye examination
 - (a) Follows finger up, down, lateral
 - (b) Can read regular print
 - (c) No blood visible in iris area
- d. Management
 - (1) Maintain patient airway
 - (2) Consider probable need for c-spine
 - (3) Nasopharyngeal airways contraindicated
 - (4) Suctioning
 - (5) Transport broken teeth with patient
 - (6) Control simple nose bleeds by pinching nostrils
 - (7) Impaled objects in cheeks may be removed if bleeding obstructs the airway
 - (8) Eye injuries
 - (a) Require covering both eyes due to consensual eye movement
 - (b) Stabilize impaled objects
 - (c) Flush eyes contaminated with chemicals with copious amounts of water
 - (d) Patients may be more comfortable sitting up – if no risk of spinal injury
 - (e) Bandaging should not occlude nose or mouth
- 3. Neck injuries (non-spinal)
 - a. Types/MOI
 - (1) Open wounds
 - (2) Blunt trauma (closed)
 - b. Signs and symptoms
 - (1) May have underlying spinal injury

- (2) Profuse bleeding from open injuries (lacerated carotid artery)
 - (3) Swelling
 - (4) Inability to swallow with esophageal injury
 - (5) Crepitus – caused by subcutaneous emphysema (air escaping under skin creating a “crackle” with digital pressure)
 - c. Assessment
 - (1) Monitor airway throughout care
 - (2) Air embolism - air may enter the circulatory system if there is penetrating injury to a large blood vessel in the neck
 - d. Management considerations in neck injuries
 - (1) Single digital pressure (gloves on) to control bleeding of carotid artery or jugular veins may be necessary
 - (2) ALS intercept
 - (3) Occlusive dressing for large vessel wounds (after bleeding controlled – to prevent air entry into circulatory system)
4. **Laryngeal injuries**
- a. **Types/MOI**
 - (1) Blunt (anterior neck strikes steering wheel, impact with fixed wire, strangulation due to intentional or unintentional hangings)
 - (2) Penetrating – (stabbing, GSW) do not remove if impaled
 - b. **Signs/Symptoms**
 - (1) Respiratory distress
 - (2) Subcutaneous emphysema
 - (3) Complete airway obstruction
 - (4) Hoarseness
 - (5) Neck bruising, hematoma, or bleeding
 - (6) Cyanotic, pale skin
 - (7) Sputum in wound
 - (8) Subcutaneous air
 - c. **Assessment**
 - (1) Airway/breathing
 - d. **Associated Injuries**
 - (1) Soft tissue and fascia
 - (2) Cervical spine injury
 - e. **Management**
 - (1) Oxygenation and ventilation
 - (2) Cervical immobilization (avoid rigid collars)
 - (3) Stabilize impaled objects if not obstructing airway
5. Nasal fractures
- a. **Types/MOI**

- (1) Blunt
- (2) Penetrating
- b. Signs and symptoms
 - (1) Bleeding (epistaxis)
 - (2) Swelling
 - (3) Deformity
 - (4) Unstable facial bones
 - (5) Nausea and vomiting (from swallowing blood)
- c. Management
 - (1) Airway
- 6. Eye/Orbit
 - a. Types of vision
 - (1) Central
 - (2) Peripheral
 - b. Types of injury
 - (1) Penetrating
 - (a) Abrasions – cornea
 - (b) Foreign body
 - (c) Lacerations – eyelid
 - (2) Blunt
 - (a) Disruption of the integrity of the eyeball
 - (b) Avulsed eyeball
 - (c) Cornea damage
 - (d) Swelling of the eyelid
 - (e) Fracture of orbit (blowout fracture)
 - (f) Hyphema (bleeding into the anterior chamber)
 - (g) Retinal detachment
 - (3) Burns to cornea
 - (a) Acid
 - (b) Alkali
 - (c) Ultraviolet
 - (4) Blast
 - (a) Loss of vision
 - (b) Severe pain
 - (c) Foreign bodies within the globe
 - c. Assessment – inspect and carefully palpate orbits
 - d. Management
 - (1) Control bleeding
 - (2) Airway
 - (3) C-spine
 - (4) Blunt injury
 - (a) Position patient based upon suspected injuries (C-spine, head injury)
 - (b) Bandaging
 - (i) Minimize pressure exerted over globe
 - (ii) Cover both eyes

- (5) Penetrating
 - (a) Stabilize impaled object
 - (b) Foreign body - irrigate
 - (c) Bandage both eyes
- (6) Burns
 - (a) Irrigate
 - (i) Acid – minimum of 5 minutes
 - (ii) Alkali – continuously for 20 minutes
- 7. Oral/Dental
 - a. Types
 - (1) Tooth avulsion
 - (2) Soft tissue or mucous membrane injury
 - b. Assessment
 - (1) Inspect oral cavity for bleeding and injuries
 - c. Management
 - (1) Airway patency
 - (2) Control bleeding
 - (3) Place avulsed tooth in cold milk or sterile saline; transport with patient
- IV. Chest trauma, incidence of
 - A. Morbidity/mortality – high rate of emergency department visits and deaths result; chest trauma compromises vital functions of thoracic organs and major blood vessels
 - B. Types/MOI
 - 1. Blunt
 - 2. Penetrating
 - 3. Energy transfer and index of suspicion regarding injury patterns
 - C. Anatomy of the chest
 - 1. Skin
 - 2. Muscles
 - 3. Bones
 - 4. Trachea
 - 5. Bronchi
 - 6. Lungs
 - 7. Vessels
 - 8. Heart
 - 9. Esophagus
 - 10. Mediastinum
 - D. Physiology
 - 1. Role of the chest in systemic oxygenation
 - a. Musculoskeletal structure
 - b. Intercostal muscle
 - c. Diaphragm
 - d. Accessory muscle
 - e. Changes in intrathoracic pressure
 - 2. Ventilation

- a. Gas exchange depends on
 - (1) Normal inspiration
 - (a) Active process
 - (b) Normal chest rise
 - (c) Negative pressure in chest allows air to flow inward
 - (2) Normal expiration – passive process
 - b. Chest wall movement – intact chest wall; visceral and parietal pleura
 - c. Minute volume – volume of air exchanged between lungs and environment per minute
- E. Pathophysiology
- 1. Impaired cardiac output related to
 - a. Trauma that affects the heart
 - (1) Heart unable to refill with blood
 - (2) Blood return to the heart is blocked
 - b. Blood loss (external and internal)
 - 2. Impaired ventilation
 - a. Collapse of lung
 - b. Multiple rib fractures
 - 3. Impaired gas exchange
 - a. Blood in lungs
 - b. Bruising of lung tissue
- F. Assessment
- 1. Pain at site of injury
 - 2. Pain aggravated by or increased with breathing effort
 - 3. Contusions
 - 4. Deformity
 - 5. Crepitus
 - 6. Dyspnea
 - 7. Hemoptysis (coughing up blood)
 - 8. Unequal chest wall expansion (paradoxical movement)
 - 9. Jugular vein distension
 - 10. Altered LOC
 - 11. Rapid, weak pulse
 - 12. Low blood pressure
 - 13. Cyanosis around lips or fingernails
 - 14. Level of consciousness
 - 15. Physical exam - inspect, auscultate and palpate
 - 16. Assess for associated Injuries
- G. Management
- 1. Airway and ventilation
 - a. Occlusion of open wounds
 - b. Positive pressure ventilation – to support flail chest
 - c. Oxygen
 - 2. Circulation

- H. Specific chest injuries
 - 3. Rapid transport for specialized trauma care and ALS intercept
 - 1. Lung injuries
 - a. Types
 - (1) Pneumothorax - lung injury resulting in air seeping into pleural space causing lung to collapse; caused by blunt or penetrating trauma; result from closed and/or open chest injuries
 - (2) Spontaneous pneumothorax – air enters into pleural space through weakened area (non-traumatic occurrence) of lung tissue (bleb)
 - (3) Tension pneumothorax – significantly increasing amounts of air in pleural space causing pressure on collapsed lung, great vessels and heart
 - (4) Hemothorax - blood collects in pleural space, collapsing the lung
 - b. Signs and symptoms
 - (1) Respiratory distress
 - (2) Altered LOC
 - (3) Distended neck veins
 - (4) Oxygenation changes due to open chest injuries
 - (5) Decreased or absent lung sounds
 - (6) Sucking sound (with open chest wound)
 - (7) Cyanosis
 - (8) Tachycardia
 - (9) Lowering blood pressure with severity of respiratory compromise
 - (10) Deviated trachea with tension pneumothorax (not easily visible)
 - c. Assessment
 - (1) presence or absence of lung sounds
 - d. Management
 - (1) Maintain airway patency
 - (2) Oxygen administration
 - (3) C-spine consideration
 - (4) Apply non-porous (occlusive) dressing for open chest wound
 - (5) Rapid transport/ALS intercept
 - 2. Myocardial injury
 - a. Heart involvement
 - (1) Myocardial contusion – bruising of the heart muscle due to blunt force; causes irregular heart rhythm
 - (2) Cardiac tamponade (pericardial tamponade) – common with penetrating chest trauma; occurs when pericardial sac fills with blood from a ruptured, torn or

lacerated coronary vessel; effect on pumping action
severely decreases cardiac output

- b. **Signs and symptoms**
 - (1) Diminished LOC
 - (2) Distended jugular veins
 - (3) Narrowing pulse pressure
 - (4) Muffled heart sounds
 - (5) Irregular pulse
 - (6) Chest pain
 - (7) Hypo-perfusion
 - c. **Assessment**
 - (1) High index of suspicion
 - (2) Inspect for external injuries
 - d. **Management**
 - (1) Airway management
 - (2) Oxygen administration
 - (3) C-spine
 - (4) Expedite transport/ALS
3. Rib fractures
- a. Signs and symptoms
 - (1) Difficulty breathing (rapid, shallow)
 - (2) Localized pain/tenderness with each breath
 - (3) Crepitus (subcutaneous emphysema)
 - b. Assessment
 - (1) Inspect, palpate, auscultate
 - c. Management
 - (1) Stabilize to minimize patient movement
 - (2) Oxygen administration
 - (3) Rapid transport
4. Flail segment – Three or more ribs fractured in two or more places (could involve sternal detachment)
- a. Signs and symptoms
 - (1) Paradoxical motion
 - (2) Painful breathing, ineffective
 - (3) Hypoxemia
 - (4) Any indication of underlying injuries
 - b. Assessment
 - (1) Inspect
 - (2) Palpate
 - (3) Auscultate
 - c. Management
 - (1) Respiratory and ventilatory support
 - (2) Oxygen
 - (3) Stabilize with bulky dressing or pad against segment
 - (4) Use caution when stabilizing a flail segment (use of heavy objects is contraindicated)

5. Other chest injuries
 - a. Clavicle fracture – suspect injuries to underlying neurovascular bundle (nerve, artery, vein); evaluate for possible signs of pneumothorax development
 - b. Traumatic asphyxia – caused by sudden and severe compression of the chest; results in rapid increase in intrathoracic pressure. This pressure diminishes the patient's ability to inhale/exhale and decreases ability of the heart to contract
 - (1) Signs and symptoms
 - (a) Distended neck veins
 - (b) Cyanosis of the face and neck
 - (c) Hemorrhage into the sclera of the eyes
 - c. **Comotio cordis – heart rhythm disruption occurring as a result of a blow directly over the heart; results in ventricular fibrillation and immediate cardiac arrest**
- I. **Age-related variations for pediatric and geriatric assessment and management of chest injuries**
 1. **Pediatric – chest wall more pliable**
 2. **Geriatric – reduced bone density can result in more significant injuries to the chest**
- V. **Abdominal and genitourinary injuries**
 - A. **Morbidity/mortality – unrecognized injuries that are not surgically repaired are the leading cause of traumatic death**
 - B. Anatomy and physiology review
 1. Quadrants and boundaries of the abdomen
 2. Surface anatomy of the abdomen
 3. Intraperitoneal structures
 4. Retroperitoneal structures
 5. Reproductive organs
 6. Solid organs
 7. Hollow organs
 8. Vascular structures
 - C. Specific injuries
 1. Closed abdominal injuries
 - a. Mechanisms of injury
 - (1) Compression
 - (2) Deceleration
 - (3) MVA
 - (4) Motorcycle collisions
 - (5) Pedestrian injuries
 - (6) Falls
 - (7) Assault
 - (8) Blast injuries
 - b. Signs and symptoms
 - (1) Pain

- (2) Guarding
 - (3) Distension – rise in abdomen between pubis and xiphoid process
 - (4) Discoloration of abdominal wall
 - (5) Tenderness – on movement
 - (6) Lower rib fractures
 - (7) May be overlooked in multi-system injuries
 - c. Assessment
 - (1) Inspection
 - (2) Noting position of the patient
 - (3) Noting pain with movement
 - (4) Auscultation – of little value in prehospital setting
 - (5) Blood loss can occur through rectum or from vomit
 - d. Management
 - (1) Oxygen
 - (2) Transport in position of comfort if indicated
 - (3) Treat for shock – internal bleeding
2. Penetrating/open abdominal injuries
- a. Low-velocity injuries – knife wound, tear of abdominal wall, consider injury to underlying organ
 - b. Medium-velocity injuries – small caliber handguns and shotguns
 - c. High-velocity injuries – high-powered rifles and handguns
 - d. Signs and symptoms
 - (1) Pain
 - (2) Bleeding
 - (3) Tachycardia
 - (4) Falling blood pressure (late)
 - (5) Pale, cool, moist skin
 - (6) Altered LOC
 - (7) Rapid, labored breathing
 - (8) Puncture wounds – entrance/exits
 - (9) Evisceration – organs protruding through the wound
 - e. Assessment
 - (1) Remove clothing
 - (2) Inspection – look for exit wounds
 - (3) Note position of patient
 - f. Management
 - (1) Cover wounds
 - (2) Use non-porous dressings if chest is involved
 - (3) Treat for shock
 - (4) Oxygen
 - (5) Do not touch or try to replace any exposed organ(s)
 - (6) Cover exposed organs with a sterile dressing, moistened with sterile water or saline, and secure in place

- (7) Flex the patient's hips and knees only if injuries to these areas do not exist
- (8) Rapid transport/ALS consideration
3. External genitalia
 - a. Common injuries
 - (1) Avulsions
 - (2) Lacerations
 - (3) Amputations
 - (4) Penetrations
 - (5) Blunt trauma
 - b. Signs and symptoms
 - (1) Pain
 - (2) Bleeding
 - (3) Swelling
 - (4) Anxiety
 - c. Assessment
 - (1) Remove clothing
 - (2) Inspection – look for exit wounds
 - (3) Note position of patient
 - d. Management
 - (1) Control bleeding
 - (2) Treat for shock
 - (3) Oxygen
 - (4) Dress open injuries with a sterile dressing, moistened with sterile water or saline, per local protocol
 - (5) Respect patient modesty
 - (6) Maintain professionalism
 - (7) Rapid transport/ALS consideration
4. Comparison of hollow organ injuries and solid organ injuries
 - a. Hollow organ injuries
 - (1) Organs
 - (a) Stomach
 - (b) Small and large bowel (intestines)
 - (c) Gallbladder
 - (d) Urinary bladder
 - (2) Commonly spill contents into the abdomen
 - (3) Injuries to hollow organs often have delayed signs and symptoms
 - (4) Pain – may be intense with open wounds to the stomach or small bowel
 - (5) Infection – delayed complication which may be fatal
 - (6) Air released into peritoneal cavity causes severe pain
 - b. Solid organ injuries
 - (1) Blood in the abdomen does not acutely produce abdominal pain

- (2) Abdominal pain from solid organ penetration or rupture is of slow onset
 - (3) Liver
 - (a) Largest organ
 - (b) Very vascular leading to hypo-perfusion
 - (c) Injured with lower rib fractures or penetrating trauma
 - (4) Spleen
 - (a) Injured in auto crashes, falls, bicycle accidents, motorcycles
 - (b) Injured with lower left rib fractures or penetrating trauma
 - (c) Left shoulder pain
 - (5) Pancreas – injury with penetrating trauma
 - (6) Kidney
 - (a) Vascular
 - (b) Blood in urine
 - (7) Diaphragm
 - (a) Abnormal respiratory sounds
 - (b) Shortness of breath
 - (8) Retroperitoneal structures – the abdomen can hold a large volume of blood due to injuries of solid organs and major blood vessels
- D. Assessment findings and associated signs and symptoms
- 1. High index of suspicion
 - 2. Pain with abdominal trauma is often masked due to other injuries
 - 3. Airway patency
 - 4. External and internal hemorrhage – monitor vital signs closely with suspicion
 - 5. Identify life-threats
 - 6. Physical exam
 - a. Inspection
 - b. Auscultation
 - c. Palpation
 - 7. Associated trauma – provide emergency staff with history of events causing trauma
 - 8. Recognize shock
- E. Management
- 1. Airway
 - 2. Oxygen administration
 - 3. C-spine considerations
 - 4. Control bleeding
 - 5. Application and inflation of the PASG for pelvic fracture stabilization
 - 6. Expedite transport/ALS
- F. Age-related variations for pediatric and geriatric assessment and management

1. Pediatric
 - a. Mechanism of injury as pedestrian
 - b. Use of PASG (fracture stabilization)
 2. Geriatric – underlying health conditions
- G. Special considerations of abdominal and genitourinary trauma
1. Sexual assault
 - a. Criminal implications and evidence management
 - b. Patient confidentiality
 - c. Treat wounds as other soft tissue injuries
 2. Vaginal bleeding due to trauma
 - a. May be due to penetrating or blunt trauma
 - b. Assess to determine pregnancy
 - c. Apply sterile absorbent vaginal pad
 - d. Determine mechanism of injury
 - e. Do not insert gloved fingers or instruments into vagina
- VI. Dressing and Bandaging
- A. Function
 1. Stop bleeding
 2. Protect the wound from further damage
 3. Prevent further contamination and infection
 - B. Dressings (sterile)
 1. Universal (trauma) dressing
 2. Gauze pads
 3. Adhesive type
 4. Occlusive
 - C. Bandages
 1. Purpose - holds dressing in place
 2. Types
 - a. Self-adherent bandages
 - b. Gauze rolls
 - c. Triangular bandages
 - d. Adhesive tape
 - e. Air splint
 3. Applying a pressure dressing
 - a. Use sterile dressing or the cleanest dressings available
 - b. Cover the wound site with the sterile surface of the dressing
 - c. Apply bandage snugly, making certain not to restrict circulation distal to injury
 - d. Secure dressing(s) with roller gauze or cravats, applying gentle, even pressure
 - e. Immobilize the injury site and elevate, as appropriate
 - f. Treat for shock
 - g. Reevaluate management and revise treatment plan as needed

MODULE 6

Trauma

Lesson 6-4

Orthopedic Trauma

OBJECTIVES

OBJECTIVES LEGEND

C=Cognitive P=Psychomotor A=Affective

1 = Knowledge level

2 = Application level

3 = Problem-solving level

COGNITIVE OBJECTIVES

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

- 6-4.1 Describe the anatomy and the function of the musculoskeletal system. (C-1)
- 6-4.2 List the major bones or bone groupings of the spinal column; the thorax; the pelvic girdle; the upper extremities; the lower extremities. (C-1)
- 6-4.3 Differentiate between an open and a closed fracture. (C-1)
- 6-4.4 Discuss complications of bone and joint injuries. (C-2)
- 6-4.5 Discuss signs and symptoms of bone and joint injuries. (C-2)
- 6-4.6 Describe general assessment of bone and joint injuries. (C-2)
- 6-4.7 Describe non-traumatic musculoskeletal disorders. (C-1)
- 6-4.8 State concepts and principles of splinting. (C-1)
- 6-4.9 Discuss the management of a possible fracture or dislocation. (C-1)
- 6-4.10 Discuss modifications to conventional splinting to accommodate a pediatric patient. (C-1)
- 6-4.11 Discuss modifications to conventional splinting to accommodate physical deformities in a geriatric patient. (C-1)
- 6-4.12 Differentiate specific care to special bone and joint injuries. (C-2)

AFFECTIVE OBJECTIVES

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

- 6-4.13 Explain the rationale for delaying splinting of minor musculoskeletal injuries involving a patient who has sustained life-threatening injuries. (A-3)

PSYCHOMOTOR OBJECTIVES

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

- 6-4.14 Demonstrate the management of various fracture or dislocation. (P-2)
- 6-4.15 Demonstrate modifying a splint to accommodate physical deformity in a geriatric patient. (P-2)

PRESENTATION

Declarative (What)

- I. Orthopedic injuries, incidence of

- A. **Morbidity – most common reason patients need medical attention**
 - B. **Mortality – 70-80% of multi-systems trauma patients sustain secondary injuries involving the musculoskeletal system**
- II. Musculoskeletal system
- A. Anatomy
 - 1. Axial skeleton
 - a. skull
 - b. spinal column
 - c. pelvic girdle
 - 2. Appendicular skeleton
 - a. Upper extremities – scapula, clavicle, humerus, radius, ulna, carpals, metacarpals and phalanges
 - b. Lower extremities – femur, patella, tibia, fibula, tarsals, metatarsals and phalanges
 - 3. Types of muscle
 - a. Skeletal
 - b. Cardiac
 - c. Smooth
- III. Functions of the musculoskeletal system
- A. Provides support
 - B. Gives structure to body and body systems
 - C. Allows mobility (flexion, extension and rotation)
- IV. Bones of the skeleton
- A. Spinal column - vertebrae
 - 1. Cervical
 - 2. Thoracic
 - 3. Lumbar
 - 4. Sacral
 - 5. Coccyx
 - B. Thorax
 - 1. Ribs
 - 2. Sternum and xiphoid
 - 3. Thoracic vertebrae
 - C. Upper extremities
 - 1. Scapula
 - 2. Clavicle
 - 3. Humerus
 - 4. Radius
 - 5. Ulna
 - 6. Carpals
 - 7. Metacarpals
 - 8. Phalanges
 - D. Pelvic girdle
 - 1. Ilium
 - 2. Ischium
 - 3. Sacrum

4. Pubis
- E. Lower extremities
 1. Femur
 2. Patella
 3. Tibia
 4. Fibula
 5. Tarsals
 6. Metatarsals
 7. Phalanges
- V. Injuries to bones
 - A. Mechanism of injury
 1. Direct force
 2. Indirect force
 3. Twisting force
 - B. Bone or joint injuries
 1. Types
 - a. Open - break in the continuity of the skin
 - b. Closed - no break in the continuity of the skin
 - c. Dislocations – disruption to a joint
 - d. Sprains – injury or disruption of a ligament
 - e. Strains – injury to a muscle
 - f. Amputations
 - g. Fracture, types
 - (1) Greenstick
 - (2) Oblique
 - (3) Transverse
 - (4) Comminuted
 - (5) Spiral
 - (6) Pathologic (resulting from diseases such as cancer and/or osteoporosis; minimal force required for fracture to occur)
 - h. Fracture descriptions based upon position
 - (1) Non-displaced (hairline)– bone remains in normal position
 - (2) Displaced – produces deformity, distortion and/or limb shortening
 - C. Complications – often related to severity of the mechanism of injury, location and general health of patient
 1. Hemorrhage
 2. Instability
 3. Damage to surrounding tissues (muscle, nerve endings, blood vessels, skin)
 4. Contamination/infection
 5. Long-term disability
 6. Interruption of blood supply to distal tissues
 7. Pregnancy with pelvic fracture

- D. Signs and symptoms
 1. Deformity or angulations
 2. Pain and tenderness
 3. Grating (crepitus)
 4. Swelling
 5. Bruising (discoloration)
 6. Exposed bone ends
 7. Joint locked into position
 8. Guarding/self-splinting
- E. **Assessment**
 1. **Standard precautions**
 2. Mechanism of injury
 - a. Primary injury
 - b. Secondary injury
 3. Determine life threat
 - a. Life threatening
 - b. Limb threatening
 4. **Six P's of musculoskeletal assessment**
 - a. **Pain**
 - (1) **Palpation**
 - (2) **Movement**
 - b. **Paralysis**
 - c. **Paresthesias (numbness or tingling)**
 - d. **Pulselessness**
 - e. **Pallor (paleness)**
 - f. **Pressure**
 5. Physical Exam –**Rapid/full-body scans**
 - a. DCAP-BTLS
 - b. Neurovascular status
 - (1) Pulse
 - (2) Capillary refill
 - (3) Motor function
 - (4) Sensation
 - c. Guarding/self-splinting
- F. General management
 1. **Standard precautions**
 2. Manual stabilization
 3. Control hemorrhage
 4. Conduct neurologic exams before and after splinting (CMS)
 5. Bandage/dress wounds before immobilization
 6. Splint in position found
 7. Remove jewelry
 8. Remove or cut away clothing
 9. Cover open wounds with sterile dressing
 10. If there is a severe deformity or the distal extremity is cyanotic or lacks pulses, align with gentle traction before splinting

11. Do not intentionally replace the protruding bones
 12. Pad each splint to prevent pressure and discomfort to the patient
 13. When in doubt, splint the patient before moving when feasible and no life threats
 14. If patient has signs of shock, align in normal anatomical position and transport (total body immobilization. Example: Backboard takes care of all immobilization on emergency basis)
 15. Pain management
 - a. Elevate
 - b. Cold
 - c. Immobilize
 - d. Consider ALS intercept for pain medications
- VI. Specific Injuries
- A. Amputation
 1. Control bleeding of stump
 2. Wrap amputation in sterile gauze and place in plastic bag
 - a. Place bag on crushed ice (do not freeze)
 - b. Transport with patient to appropriate hospital
 - B. Sprains/Strains – difficult to differentiate from fracture; manage same as fracture
 1. Sprain
 - a. Tearing of stabilizing connective tissue
 - b. Injury to ligaments, articular capsule, synovial membrane and tendons crossing the joint
 - c. Most vulnerable – ankles, knees, shoulders
 - d. Special assessment findings
 - (1) Sound of a “snap” with injury
 - (2) Edema at joint
 - (3) Point tenderness
 - e. Special management considerations
 - (1) Apply cold and pressure
 - (2) Elevation
 - (3) Elastic wrap to control swelling
 - (4) Immobilization if needed
 - (5) Pain management (consider ALS)
 2. Strain
 - a. Muscle pull
 - b. Stretch, tear, or rip of muscle itself
 - c. Produced by abnormal contraction
 - d. May range from minute separation to complete rupture
 - e. Special Assessment Findings
 - (1) Sound of a “snap” when muscle tears
 - (2) Severe weakness of the muscle
 - (3) Sharp pain immediately with occurrence
 - (4) Extreme point tenderness
 - f. Special Management Considerations

- (1) Apply cold and pressure
 - (2) Elastic wrap
 - (3) Pain relief
 - (4) Elevation of part
- C. Pelvic fracture
1. Expect and prepare for shock
 2. Immobilize on long spine board
 3. Apply PASG (pelvic stabilization)
 4. Pelvic wrap
- D. Femur fracture
1. Traction splint
 2. Long spine board
- E. Tibia/Fibula fracture
1. Pneumatic splint
 2. Long spine board
 3. Splint to opposite leg (use padding between)
 4. Rigid splint
- F. Shoulder injuries
1. Sling and swathe
 2. Vacuum splints
- G. Knee injuries
1. Rigid splints
 2. No traction splint
- H. Clavicle fractures
1. Sling and swathe
- I. Humerus fracture
1. Sling and swathe
 2. Rigid splints
- J. Forearm fracture
1. Sling and swathe
 2. Rigid splints
- VII. Splinting
- A. Reasons/rationale for splinting
1. Prevent motion of bone fragments, bone ends or angulated joints
 2. Minimize the following complications:
 - a. Damage to muscles, nerves, or blood vessels caused by broken bones
 - b. Conversion of a closed painful, swollen, deformed extremity to an open painful, swollen, deformed extremity
 - c. Restriction of blood flow as a result of bone ends compressing against blood vessels
 - d. Excessive bleeding due to tissue damage caused by bone ends
 - e. Increased pain associated with movement of bone ends
 - f. Paralysis of extremities due to a damaged spine
- B. Types of splints

1. Rigid splints
 2. **Formable**
 3. Traction splints (for femur fractures)
 4. Pneumatic splints
 5. Improvised splints – pillow or blanket
 6. Pneumatic Anti Shock Garment for hip or pelvic injuries
 7. Short spine board
 8. Long spine board
- C. Hazards of improper splinting
1. Compression of nerves, tissues and blood vessels from the splint
 2. Delay in transport of a patient with life threatening injury
 3. Splint applied too tight on the extremity reducing distal circulation
 4. Aggravation of the bone or joint injury
 5. Cause or aggravate tissue, nerve, vessel or muscle damage from excessive bone or joint movement
- D. Special considerations of splinting
1. Long bone splinting procedure
 - a. **Standard precautions**
 - b. Apply manual stabilization
 - c. Assess CMS
 - d. If there is a severe deformity or the distal extremity is cyanotic or lacks pulses, align with gentle traction before splinting
 - e. Measure splint
 - f. Apply splint immobilizing the bone and joint above and below the injury
 - g. Secure entire injured extremity
 - h. Immobilize hand/foot in position of function
 - i. Geriatric and pediatric patients may require additional padding to accommodate deformities and variations in patient size
 - j. Reassess CMS after application of splint and record
 2. Splinting a joint injury
 - a. **Standard precautions**
 - b. Apply manual stabilization
 - c. Assess CMS
 - d. Align with gentle traction if distal extremity is cyanotic or lacks pulses and no resistance is met
 - e. Immobilize the site of injury
 - f. Immobilize bone above and below the site of injury
 - g. Reassess CMS after application of splint and record
 3. Traction splinting
 - a. Indications for use is a fractured femur with no joint or lower leg injury
 - b. Contraindications of the use of a traction splint
 - (1) Injury is close to the knee

- (2) Injury to the knee exists
 - (3) Injury to the hip
 - (4) Injured pelvis
 - (5) Partial amputation or avulsion with bone separation, distal limb is connected only by marginal tissue. Traction would risk separation.
 - (6) Lower leg or ankle injury.
- c. Traction splinting procedure
- (1) **Standard precautions**
 - (2) Assess CMS
 - (3) Perform manual stabilization of the injured leg
 - (4) Apply manual traction - required when using a bi-polar traction splint
 - (5) Prepare/adjust splint to proper length
 - (6) Position splint under injured leg
 - (7) Apply proximal securing device (ischial strap)
 - (8) Apply distal securing device (ankle hitch)
 - (9) Apply mechanical traction
 - (10) Position/secure support straps
 - (11) Re-evaluate proximal/distal securing devices
 - (12) Reassess CMS after application of the splint and record
 - (13) Secure torso to the long board to immobilize hip
 - (14) Secure splint to the long board to prevent movement of splint
- VIII. **Age-related variations for pediatric and geriatric assessment and management**
- A. **Pediatric**
1. **Bones contain greater amounts of cartilage making them more flexible, in comparison to adults**
 2. **Fracture to epiphyseal plate (growth plate) may lead to abnormal growth of bone**
- B. **Geriatric**
1. **Osteoporosis (decreased bone density)**
 - a. **Increases the likelihood of fractures with minimal trauma**

MODULE 6

Trauma

Lesson 6-5

Nervous System Head and Spine

OBJECTIVES

OBJECTIVES LEGEND

C=Cognitive P=Psychomotor A=Affective

1 = Knowledge level

2 = Application level

3 = Problem-solving level

COGNITIVE OBJECTIVES

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

- 6-5.1 List anatomical components of the nervous system. (C-1)
- 6-5.2 Discuss physiology of the central nervous system. (C-2)
- 6-5.3 Define the structure of the skeletal system as it relates to the nervous system. (C-1)
- 6-5.4 Relate mechanism of injury to potential injuries of the head and spine. (C-3)
- 6-5.5 Discuss general assessment considerations in spinal trauma. (C-2)
- 6-5.6 Describe the implications of not properly caring for potential spine injuries. (C-1)
- 6-5.7 State the signs and symptoms of spine injury. (C-1)
- 6-5.8 Describe the method of determining if a responsive patient may have a spine injury. (C-1)
- 6-5.9 Relate the airway management techniques to the patient with a suspected spine injury. (C-3)
- 6-5.10 Describe how to stabilize the cervical spine. (C-1)
- 6-5.11 Discuss indications for sizing and using a cervical collar. (C-1)
- 6-5.12 Describe methods of securing a patient to a long spine board. (C-1)
- 6-5.13 List instances when a short spine board should be used. (C-1)
- 6-5.14 Describe methods of securing a patient using a short spine board. (C-1)
- 6-5.15 Describe the indications for the use of rapid extrication. (C-1)
- 6-5.16 List steps in performing rapid extrication. (C-1)
- 6-5.17 State the circumstances when a helmet should be left on the patient. (C-1)
- 6-5.18 Discuss the circumstances when a helmet should be removed. (C-1)
- 6-5.19 Discuss various methods for removal of a helmet. (C-1)
- 6-5.20 Discuss how to properly stabilize a pediatric patient utilizing adult sized equipment. (C-1)
- 6-5.21 Describe how to stabilize a pediatric patient utilizing specialized pediatric sized equipment. (C-1)
- 6-5.22 Discuss how to modify stabilization for a geriatric patient who has curvature of the spine. (C-1)
- 6-5.23 List types of head injuries. (C-1)
- 6-5.24 List signs and symptoms associated with types of head injuries. (C-1)
- 6-5.25 Discuss indicators of increasing intracranial pressure. (C-2)

- 6-5.26 Describe the components of the Glasgow Coma Scale (GCS) utilized in the evaluation of a suspected head injury. (C-1)
- 6-5.27 Discuss different types of closed head injuries and brain injuries. (C-2)
- 6-5.28 Describe general assessment considerations for brain trauma. (C-2)
- 6-5.29 Describe management of a patient with a possible brain or head injury. (C-1)

AFFECTIVE OBJECTIVES

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

- 6-5.30 Explain the rationale for immobilization of the entire spine when a cervical spine injury is suspected. (A-3)
- 6-5.31 Explain the rationale for utilizing the rapid extrication approach. (A-3)

PSYCHOMOTOR OBJECTIVES

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

- 6-5.32 Demonstrate opening the airway in a patient with suspected spinal cord injury. (P-1, 2)
- 6-5.33 Demonstrate evaluating a responsive patient with a suspected spinal cord injury. (P-1, 2)
- 6-5.34 Demonstrate stabilization of the cervical spine for various patients, including geriatric and pediatric patients. (P-1, 2)
- 6-5.35 Demonstrate how to log roll a patient with a suspected spinal cord injury. (P-1, 2)
- 6-5.36 Demonstrate securing various patients to a long spine board, including geriatric and pediatric patients. (P-1, 2)
- 6-5.37 Demonstrate special immobilization techniques utilized to properly package a geriatric patient with curvature of the spine. (P-2)
- 6-5.38 Demonstrate using the short board immobilization technique. (P-1, 2)
- 6-5.39 Demonstrate procedure for rapid extrication. (P-1, 2)
- 6-5.40 Demonstrate preferred methods for stabilization of a helmet. (P-1, 2)
- 6-5.41 Demonstrate helmet removal techniques. (P-1, 2)

PRESENTATION

Declarative (What)

- I. **Morbidity and mortality, incidence of**
 - A. **Brain injury – wide variations in severity dependent upon mechanism of injury; disability and death significant**
 - B. **Spinal injury – directly associated with occurrence of brain injury; permanent disability and death are significant**
- II. Nervous system
 - A. Central nervous system (CNS)
 1. Divisions
 - a. Autonomic (involuntary) nervous system
 - (1) Sympathetic – fight or flight

- (2) Parasympathetic – feed and breed
 - b. Somatic (voluntary) nervous system
 - 2. Components
 - a. Brain
 - (1) **Meninges**
 - (a) **Dura mater**
 - (b) **Arachnoid mater**
 - (c) **Pia mater**
 - (2) **Gray matter – composed of nerve cells**
 - (3) **White matter – covered nerve pathways that conduct messages of the brain**
 - (4) **Brain stem – center for involuntary functions, temperature regulation, respiratory and heart rate, nerve function transmissions**
 - (5) **Cerebrum – main part of brain, divided into two hemispheres, with four lobes**
 - (6) **Cerebellum – center for equilibrium and coordination**
 - b. Spinal cord – communication between brain and peripheral nerves
 - c. Cerebral spinal fluid –protects and nourishes brain and spinal cord
 - B. Peripheral nervous system – peripheral nerves connect the body to the spinal cord and the brain
 - a. Sensory nerves
 - b. Motor nerves
 - C. **Physiology**
 - 1. **Homeostasis – balance**
 - 2. **Function – body’s communication system which helps maintain a constant internal environment; monitors and responds to external environment**
 - 3. **Hormone regulation**
 - a. **Epinephrine (adrenaline)**
 - b. **Acetylcholine**
- III. Skeletal system
 - A. Functions – support and protection
 - B. Components
 - 1. Spinal column sections – protection of spinal cord
 - a. Cervical (7)
 - b. Thoracic (12)
 - c. Lumbar (5)
 - d. Sacrum (5)
 - e. Cocccyx (4)
 - 2. Skull
 - a. Cranium
 - b. Face
- IV. Injuries to the spine

- A. Mechanism of injury
 - 1. Compression
 - a. Falls
 - b. Diving accidents
 - c. Motor vehicle accidents
 - 2. Excessive flexion, extension, rotation
 - 3. Lateral bending
 - 4. Distraction
 - a. Pulling apart of the spine
 - b. Hangings
 - 5. Maintain a high index of suspicion
 - a. Motor vehicle crashes
 - b. Pedestrian - vehicle collisions
 - c. Falls
 - d. Blunt trauma
 - e. Penetrating trauma to head, neck, or torso
 - f. Motorcycle crashes
 - g. Hangings
 - h. Diving accidents
 - i. Unconsciousness
- B. General assessment considerations
 - 1. Neurological examination
 - a. Movement of extremities
 - (1) Absent or weak
 - (2) Note level of impairment
 - b. Ability to walk, move extremities or feel sensation; or lack of pain to spinal column does not rule out the possibility of spinal column or cord damage
 - c. Assess equality of strength of extremities
 - (1) Hand grip
 - (2) Gently push feet against hands
 - d. Sensation
 - (1) Present throughout body
 - (2) Absent – note the specific level of impairment
 - (3) Loss of sensation or paralysis in the upper or lower extremities
 - (4) Loss of sensation or paralysis below the suspected level of injury
 - (5) Altered sensation distal to injury – tingling, numbness, “electric shocks”
 - 2. Respiratory ability
 - a. Chest wall movement
 - b. Abdominal excursion
 - 3. Vital signs
 - a. Hypotension may be present with cervical or high thoracic spine injuries

- b. Heart rate may be slow or fail to increase in response to hypotension
- 4. Inspect and palpate for pain and tenderness
 - a. Present at injury site
 - b. Pain associated with moving
 - (1) Do not ask the patient to move to try to elicit a pain response
 - (2) Do not move the patient to test for a pain response
 - c. Pain independent of movement or palpation
 - (1) Along spinal column
 - (2) Lower legs
 - (3) May be intermittent
- 5. Inspect for contusions, deformities, lacerations, punctures, penetrations, swelling
- 6. Incontinence
- 7. Priapism
- 8. Inability to maintain body temperature
- C. Patient interview
 - 1. Tell the patient not to move while asking questions
 - 2. Questions to ask
 - a. Does your neck or back hurt?
 - b. What happened?
 - c. Where does it hurt?
 - d. Can you move your hands and feet?
 - e. Can you feel me touching your fingers?
 - f. Can you feel me touching your toes?
 - 3. If patient unresponsive, interview bystanders regarding MOI
- D. Complications
 - 1. Inadequate breathing effort
 - 2. Paralysis
 - 3. Neurogenic Shock (spinal shock) – caused by a sudden loss of the sympathetic nervous system signals to the smooth muscles in vessel walls, resulting in a drop in blood pressure as well as inability to maintain normal body temperature. This can result from severe brain and spinal cord injury.
- E. Management of spinal injury
 - 1. Standard precautions
 - 2. Establish and maintain in-line immobilization/stabilization
 - a. Place the head in a neutral in-line position unless the patient complains of pain or the head is not easily moved into position
 - b. Place head in alignment with spine
 - c. Maintain constant manual in-line immobilization until the patient is properly secured to a backboard with the head immobilized
 - 3. Assess pulse, motor and sensation in all extremities

4. Apply a rigid cervical collar
 - a. Indications
 - (1) Any suspected injury to the spine based on mechanism of injury, history or signs and symptoms
 - (2) Use in conjunction with short and long backboards
 - b. Proper sizing
 - (1) Various types of cervical collars exist, therefore, sizing is based on the specific design of the device
 - (2) An improperly sized collar has a potential for further injury
 - (3) Do not obstruct the airway with the placement. If it doesn't fit use a rolled towel and tape to the board and manually support the head.
 - c. Precautions
 - (1) Cervical collars alone do not provide adequate in-line immobilization
 - (2) Manual immobilization must always be utilized
5. Seated patient, short spine board
 - a. Provides stabilization and immobilization to the head, neck and torso
 - b. Used to immobilize non-critical sitting patients with suspected spinal injuries
 - c. General application
 - (1) Start manual in-line immobilization
 - (2) Assess pulses, motor and sensory function in all extremities
 - (3) Apply a cervical collar
 - (4) Position short board immobilization device behind the patient
 - (5) Secure the device to the patient's torso
 - (6) Evaluate torso and groin fixation and adjust as necessary without excessive movement of the patient
 - (7) Evaluate and pad behind the patient's head as necessary to maintain neutral in-line immobilization
 - (8) Secure the patient's head to the device
 - (9) Release manual immobilization of head
 - (10) Rotate or lift the patient to the long spine board
 - (11) Immobilize patient to long spine board
 - (12) Reassess pulses, motor and sensory function in all extremities
6. Lying patient, long spine board
 - a. Provides stabilization and full immobilization to the head, neck and torso, pelvis and extremities
 - b. Used to immobilize patients found in a lying position
 - c. Sometimes used in conjunction with short backboards
 - d. General application

- (1) Start manual in-line immobilization
 - (2) Assess pulses, motor and sensory function in all extremities
 - (3) Apply a cervical collar
 - (4) Position the device
 - (5) Move the patient onto the device by log roll, suitable lift or slide, or scoop stretcher
 - (a) One EMT must maintain in-line immobilization
 - (b) EMT at the head directs the movement of the patient
 - (c) One to three other EMTs control the movement of the rest of the body
 - (d) Quickly assess posterior body if not already done in initial assessment
 - (e) Position the long spine board under the patient
 - (f) Roll patient onto the board at the command of the EMT holding in-line immobilization
 - (6) Pad voids between the patient and the board (likely needed to accommodate any deformities seen with geriatric patients)
 - (a) Adult
 - (i) Under the head and/or neck as needed
 - (ii) Under the torso as needed
 - (b) Infant and child - pad under the shoulders to the toes to establish a neutral position
 - (7) Immobilize torso and legs to the board by applying straps
 - (8) Immobilize the patient's head to the board
 - (9) Reassess pulses, motor and sensation and record
7. Standing patient, long spine board
- a. Position the device behind patient
 - b. Move the patient onto the device by:
 - (1) One rescuer on each side of the patient, one additional rescuer at the foot facing the patient
 - (2) The rescuers on both sides of the patient reach with the hand closest to the patient under the arm to grasp the board, and use the hand farthest from the patient to secure the head
 - (3) Once the position is assured, they place the leg closest to the board behind the board and begin to tip the top backward. The rescuer at the foot of the board secures the board and the patient to prevent them from sliding, and the board is brought into a level horizontal position.
- F. Special situations associated with spinal injury management
1. Rapid extrication

- a. Indications
 - (1) Unsafe scene
 - (2) Unstable patient condition warrants immediate movement and transport
 - (3) Patient blocks the EMTs access to another, more seriously injured patient
 - (4) Based on time and the patient; not the EMTs preference
 - b. Procedure - refer to Module 1: Preparatory: Lifting and Moving
2. Helmet removal
- a. Special assessment needs for patients wearing helmets
 - (1) Airway and breathing
 - (2) Fit of the helmet and patient's movement within the helmet
 - (3) Ability to gain access to airway and breathing
 - b. Indications for leaving the helmet in place
 - (1) Good fit with little or no movement of the patient's head within the helmet
 - (2) No impending airway or breathing problems
 - (3) Removal would cause further injury to the patient
 - (4) Proper spinal immobilization could be performed with helmet in place
 - (5) No interference with the EMT's ability to assess and reassess airway and breathing
 - c. Indications for removing the helmet
 - (1) Inability to assess and/or reassess airway and breathing
 - (2) Restriction of adequate management of the airway or breathing
 - (3) Improperly fitted helmet allowing for excessive patient head movement within the helmet
 - (4) Proper spinal immobilization cannot be performed due to helmet
 - (5) Cardiac arrest
 - d. Types of helmets:
 - (1) Sports
 - (a) Face typically open
 - (b) Easier access to airway
 - (2) Motorcycle
 - (a) Full face
 - (b) Shield
 - (3) Recreational
 - e. General rules for removal of a helmet
 - (1) The technique for removal of a helmet depends on the actual type of helmet worn

- (2) Take eyeglasses off before removal of the helmet
 - (3) One EMT stabilizes the helmet by placing his hands on each side of the helmet with the fingers on the mandible to prevent movement
 - (4) Second EMT loosens the strap
 - (5) The second EMT places one hand on the mandible at the angle of the jaw and the other hand on the occipital region
 - (6) The EMT holding the helmet pulls the sides of the helmet apart and gently slips the helmet halfway off the patient's head then stops
 - (7) The EMT maintaining stabilization of the neck repositions, slides the posterior hand superiorly to secure the head from falling back after complete helmet removal
 - (8) The helmet is removed completely
 - (9) The EMT then can proceed with spinal immobilization as indicated in the spinal immobilization section
 - (10) Local protocols may deviate from national standards. Refer to state and local protocols for accepted alternative methods.
3. Infants and children - immobilize the infant or child on a rigid board appropriate for size (short, long or padded splint).
 - a. Head size and anatomical positions during immobilization
 - (1) Pad from the shoulders to the heels of the infant or child, if necessary to maintain neutral immobilization
 - (2) Properly size the cervical immobilization device. If it doesn't fit, use a rolled towel and tape to the board and manually support head. An improperly fit immobilization device will do more harm than good.
 - b. Use of child safety seats
 4. Geriatric patients- may require special packaging due to curvature of the spine
 - a. Pad areas of the posterior side of the patient's head and neck regions to support and maintain stabilization, without increasing discomfort
 5. Pregnant patients – should be placed in left lateral recumbent position after being secured onto a long spine board
- V. Injuries to the head
- A. Generalized types
 1. Closed – the brain sustains injury but there is no external opening into the brain
 2. Open – an opening from the brain to the outside exists
 - B. Causes of head and brain injuries
 1. Blunt trauma
 2. Penetrating trauma

3. Deceleration
4. Compression
- C. Scalp lacerations
 1. Very vascular, may bleed more than expected
 2. Control bleeding with direct pressure
- D. Skull fractures
 1. Linear – non-displaced skull fracture
 2. Compressed – result from high-energy, blunt trauma;
 3. Open – associated with severe forces of energy; brain tissue may be exposed; high mortality rate
 4. Basilar – high-energy trauma; linear fracture to base of the skull; difficult to diagnose. Signs may include:
 - a. Blood or fluid (cerebrospinal fluid) leakage from the ears or nose
 - b. Bruising around the eyes (raccoon eyes)
 - c. Bruising behind the ears, over the mastoid process (Battle's sign)
- E. **Traumatic brain injury (TBI)** – traumatic insult to brain tissue or bleeding into the skull resulting from a significant impact to the head. Bleeding within the skull and swelling to the brain result in increases in intracranial pressure. Injury categories:
 1. **Primary (direct)**
 2. **Secondary (indirect)**
 3. Open head injuries
 4. Closed head injuries and brain injuries
 - a. Concussion – Temporary disruption to brain without injury due to closed trauma
 - (1) Signs/symptoms
 - (a) Delayed motor and verbal responses
 - (b) Inability to focus attention
 - (c) Lack of coordination
 - (d) Disorientation
 - (e) Inappropriate emotional responses
 - (f) Memory deficit (amnesia)
 - (g) Inability to recall simple concepts, words
 - (h) Nausea/vomiting
 - (i) Headache
 - b. Contusion – bruise of brain matter, may be diffuse or localized to one area; results in physical injury to brain tissue
 - c. Coup-contre coup injury – (front-and-rear injury) brain injuries resulting from the brain striking the inside of the skull, then slamming into the opposite inside of the skull
 - d. Cerebral laceration
 - e. **Sources of intracranial pressures**
 - (1) Epidural hematoma – bleeding between the skull and dura mater

- (a) Signs/symptoms – rapidly progressing
 - (i) Loss of consciousness followed by a lucid interval
 - (ii) Unequal pupils – fixed and dilated on the side of the hematoma
 - (2) Subdual hematoma– bleeding between the dura mater and the brain
 - (a) Signs/symptoms – signs of increased ICP develop gradually
 - (i) Fluctuating level of consciousness
 - (ii) Slurred speech
 - (3) Intracerebral bleed– bleeding with the brain tissue
 - (a) Signs/symptoms – dependent upon region of brain involved and size of hemorrhage
 - (i) Rapid deterioration
 - (4) Subarachnoid bleed– bleeding into the subarachnoid space where CSF circulates
 - (a) Signs/symptoms
 - (i) Sudden, severe headache
 - (ii) Decreased LOC
 - (iii) Abnormal pupils
 - (iv) Vomiting
 - (v) Seizures
- F. Assessment components specific to evaluation of head injury and brain injury
- 1. Complete a neurological exam
 - a. Appearance and behavior
 - (1) Alert
 - (2) Responds to verbal stimuli
 - (3) Responds to painful stimuli
 - (4) Unresponsive
 - b. Observe posture and motor behavior – appropriate movement
 - c. Facial expression
 - d. Speech and language
 - e. Thoughts and perceptions
 - (1) Logical
 - (2) Ability to make decisions
 - f. Memory and attention
 - (1) Assess orientation
 - (a) Person
 - (b) Place
 - (c) Time
 - (d) Purpose
 - (2) Knowledge of recent events
 - g. Glasgow Coma Scale (adult and pediatric scales exist)

- (1) Neurological evaluation for adults based upon
 - (a) Eye opening
 - (b) Best verbal response
 - (c) Best motor response
- (2) Scoring
 - (a) Mild – 13 -15
 - (b) Moderate – 8-12
 - (c) Severe – less than 8
- h. Pupils
 - (1) Equal
 - (2) React to light
- 2. Vital signs
 - a. Blood pressure
 - (1) Systolic pressure increase
 - (2) Hypotension is associated with poorer outcomes in head injured patients
 - b. Pulse rate – may be slower than normal if severe head injury
- G. Generalized assessment findings and symptoms associated with head and brain injuries
 - 1. Altered or decreasing mental status is the best indicator
 - a. Confusion, disorientation, or repetitive questioning
 - b. Conscious - deteriorating mental status
 - c. Unresponsive
 - 2. Irregular breathing pattern
 - 3. Elevated blood pressure
 - 4. Decreased pulse rate
 - 5. History of unconsciousness or amnesia of event
 - 6. Consideration of mechanism of injury
 - a. Deformity of window shield
 - b. Deformity of helmet
 - 7. Contusions, lacerations, hematomas to the scalp
 - 8. Deformity to the skull
 - 9. Blood or fluid (cerebrospinal fluid) leakage from the ears and nose
 - 10. Raccoon's eyes
 - 11. Battle's signs
 - 12. Nausea and/or vomiting
 - 13. Unequal pupil size – fixed and dilated
 - 14. Seizure
 - 15. Posturing (decorticate and decerebrate)
- H. Indicators of increasing intracranial pressure (ICP)
 - 1. Decreased level of consciousness
 - 2. Increased blood pressure and slowing pulse rate
 - 3. Pupils still active
 - 4. Cheyne-Stokes respirations
 - 5. Initially localize to painful stimuli
 - 6. All effects reversible at this state

7. Middle brain stem involved
 - a. Wide pulse pressure and bradycardia
 - b. Pupils nonreactive or sluggish
 - c. Central neurogenic hyperventilation
 - d. Decerebrate (extension)
8. Lower portion of brain stem involved/medulla
 - a. Pupil blown – same side of injury
 - b. Ataxic respirations
 - c. Flaccid response to painful stimuli
 - d. Pulse rate
 - e. Diminished blood pressure
 - f. Cushing's triad (Cushing's reflex)
- I. Management of head injury
 1. Standard precautions
 2. Suspect cervical spine injury based on mechanism of injury
 3. Maintain airway
 4. Administer oxygen by non-rebreather mask – maintain oxygen saturation above 90%
 5. Nasopharyngeal airways may be contraindicated
 6. Assist ventilations at the rate of 20 breaths per minute with signs of ICP (per Traumatic Brain Institute guidelines)
 7. Control bleeding (do not apply pressure to an open or depressed skull injury)
 8. Position - elevate head of backboard 30 degrees
 9. Be prepared for changes in patient condition
 10. Psychological support
 11. Effective communication and documentation
 12. Transport Considerations
 - a. Head trauma patients with impaired airway or ventilation, open wounds, abnormal vital signs, or who do not respond to painful stimuli may need rapid extrication
 - b. Head trauma patients must be transported to appropriate trauma centers
 - c. Head trauma patients may deteriorate rapidly and may need air medical transport
 - d. Adequate airway, ventilation, and oxygenation are critical to the outcome of head trauma patients
 - e. Head trauma patients frequently vomit – keep suction available
 - f. Head trauma patients frequently have seizures
- J. Refer to Traumatic Brain Institute guidelines
- K. Age-related variations for pediatric and geriatric assessment and management
 1. Pediatric
 - a. Proportion of head to body and development of bones leads to increased risk of injury

- b. Shaken baby syndrome – severe and often times fatal injuries resulting from violent shaking and impacting of the infant's head
2. Geriatric
- a. Brain decreases in size with age
 - b. Ground level falls can result in significant brain injuries

MODULE 6

Trauma

Lesson 6-6

Environmental Emergencies

OBJECTIVES

OBJECTIVES LEGEND

C=Cognitive P=Psychomotor A=Affective

1 = Knowledge level

2 = Application level

3 = Problem-solving level

COGNITIVE OBJECTIVES

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

- 6-6.1 Discuss temperature regulation. (C-1)
- 6-6.2 Describe the various ways that the body loses heat. (C-1)
- 6-6.3 List examples of local cold injuries. (C-1)
- 6-6.4 List signs and symptoms of local cold injuries. (C-1)
- 6-6.5 Explain management of local cold injuries. (C-1)
- 6-6.6 Define hypothermia. (C-1)
- 6-6.7 List signs and symptoms of hypothermia. (C-1)
- 6-6.8 Discuss management of hypothermia. (C-2)
- 6-6.9 List forms of heat-related illnesses. (C-1)
- 6-6.10 Discuss the progression of signs and symptoms related to each heat-related illness. (C-3)
- 6-6.11 Discuss management for each form of heat-related illness. (C-3)
- 6-6.12 Discuss various submersion incidents. (C-3)
- 6-6.13 Describe management for a drowning. (C-2)
- 6-6.14 List types of dive emergencies. (C-1)
- 6-6.15 Compare signs and symptoms of decompression sickness with those of air embolism. (C-3)
- 6-6.16 Discuss management for dive emergencies. (C-3)
- 6-6.17 Discuss pathophysiology of bites, stings and envenomations. (C-2)
- 6-6.18 Discuss management of bites, stings and envenomations. (C-1)

AFFECTIVE OBJECTIVES

No affective objectives identified.

PSYCHOMOTOR OBJECTIVES

- 6-6.19 Demonstrate the assessment and management of a patient with exposure to cold.(P-1,2)
- 6-6.20 Demonstrate the assessment and management of a patient with exposure to heat. (P-1,2)
- 6-6.21 Demonstrate the assessment and management of a drowning patient. (P-1,2)
- 6-6.22 Demonstrate the assessment and management of a patient with a dive related emergency. (P-1,2)

6-6.22 Demonstrate the assessment and management of a patient who has sustained an envenomation. (P-1,2)

PRESENTATION

Declarative (What)

- I. Temperature regulation and temperature-related illnesses
 - A. Incidents – emergencies include localized injuries and systemic illness
 1. Temperature-related injuries and illness
 - a. Cold exposure
 - (1) Localized cold injury
 - (2) Hypothermia – low body core temperature
 - b. Heat exposure
 - (1) Heat cramps
 - (2) Heat exhaustion
 - (3) Hyperthermia – high body core temperature
 2. Mechanisms for regulating temperature – maintenance of normal body temperature range critical for body's chemistry to work efficiently
 1. Sweating
 2. Radiation of body heat into atmosphere
 - II. Cold exposure
 - A. Heat loss occurs by
 1. Radiation
 2. Convection
 3. Conduction
 4. Evaporation
 5. Respiration
 - B. Contributing factors related to heat loss
 1. Environment factors
 - (1) Ambient temperature
 - (2) Wind speed
 - (3) Moisture
 2. Age of patient
 - a. Geriatrics
 - (1) Low income may prohibit adequate heat in home
 - (2) Elderly have less muscle mass and subcutaneous tissue
 - (3) Elderly may have chronic illnesses and failing body systems
 - (4) May have poor diets
 - (5) Many medications may contribute to hypothermia
 - (6) Decreased activity
 - b. Pediatrics
 - (1) Infants and young children are small with large surface area

- (2) Small muscle mass, so shivering is poor in children and not at all in infants
 - (3) Less body fat
 - (4) Younger children need help to protect self. Cannot put on or take off clothes
 3. Inadequate clothing
 4. Duration of exposure
 5. Alcohol or other medication ingestion
 6. Attempted suicide
 7. Immersion
 8. Activity level
 9. Pre-existing injury or illness
 - a. Shock
 - b. Head injury
 - c. Burns
 - d. Generalized infection
 - e. Spinal cord injury
 - f. Hypoglycemia
 - g. Altered mental status from any cause
- C. Local cold injuries – local exposure of body part
 1. Impaired local blood flow
 2. Ice crystals form within soft tissue
 3. Typically involves exposed fingers, toes, ears, nose, and face
 4. Tissue damage – temporary or permanent (may lead to amputation)
 5. Signs and symptoms
 - a. Local injury with clear demarcation
 - b. Early or superficial injury
 - (1) Blanching of the skin - palpation of the skin in which normal color does not return
 - (2) Loss of feeling and sensation in the injured area
 - (3) Skin remains soft
 - (4) If rewarmed, tingling sensation
 - c. Late or deep injury
 - (1) White, waxy skin
 - (2) Firm to frozen feeling upon palpation
 - (3) Swelling may be present
 - (4) Blisters may be present
 - (5) If thawed or partially thawed, skin may appear flushed with areas of purple and blanching or mottled and cyanotic
 6. Management
 - a. Remove the patient from the environment
 - b. Protect the cold injured extremity from further injury
 - c. Administer oxygen if not already done as part of the primary assessment

- d. Remove wet or restrictive clothing
 - e. If early or superficial injury
 - (1) Splint extremity
 - (2) Cover the extremity
 - (3) Do not rub or massage
 - (4) Do not re-expose to the cold
 - f. If late or deep cold injury
 - (1) Remove jewelry
 - (2) Cover with dry dressings
 - (3) Do not:
 - (a) Break blisters
 - (b) Rub or massage area
 - (c) Apply heat
 - (d) Rewarm
 - (e) Allow the patient to walk on the affected extremity
 - g. If delayed transport, proceed with active rewarming
 - (1) Immerse affected part in warm water
 - (a) Immerse part in tepid water (100-105 degrees Fahrenheit)
 - (2) Rewarm until the part is soft and color and sensation return
 - (3) Dress the area with dry sterile dressings. If hand or foot, place dry sterile dressings between fingers or toes.
 - (4) Protect against refreezing
 - (5) Expect the patient to complain of severe pain
- D. Hypothermia
- 1. Core body temperature falls below 95 degrees F
 - a. Vital organs malfunction
 - b. Body loses ability to regulate temperature and to generate heat
 - 2. Environmental conditions of cold exposure
 - a. Obvious exposure
 - b. Subtle exposure
 - (1) Ethanol ingestion
 - (2) Underlying illness
 - (3) Overdose/poisoning
 - (4) Major trauma
 - (5) Outdoor resuscitation
 - (6) Ambient temperature decreased
 - 3. Signs and symptoms
 - a. Decreased level of consciousness
 - (1) Correlates with the degree of hypothermia
 - (2) Poor judgment exhibited (patient may actually remove clothing)

- (3) Memory disturbances
- (4) Mood changes
- b. Impaired motor function
 - (1) Rigidity
 - (2) Altered balance and poor coordination
 - (3) Reduces loss of sensation – to touch
 - (4) Dizziness
 - (5) Speech difficulty
- c. Shivering
 - (1) Muscle contractions help to increase body temperature
 - (2) Temperature will drop quickly when shivering stops
- d. Breathing
 - (1) Early – rapid breathing
 - (2) Late – shallow, slow or even absent breathing
- e. Pulse
 - (1) Early – rapid
 - (2) Late – slow and barely palpable and/or irregular, or completely absent
- f. Blood pressure – lowered to absent
- g. Cool abdominal skin below clothing
- h. Delayed pupil response
- i. Complaints of joint/muscle stiffness
- j. Skin
 - (1) Red – early
 - (2) Pale
 - (3) Cyanotic – blue – gray
 - (4) Stiff/hard
- k. With extreme hypothermia
 - (1) Cardiac insufficiency
 - (2) May have no palpable pulse
 - (3) Cardiac arrest
- 4. Management
 - a. Remove patient from the environment (protect from further heat loss)
 - b. Remove wet clothing; cover with blanket
 - c. Gentle handling (to decrease risk of ventricular fibrillation)
 - d. Do not allow the patient to walk
 - e. Administer oxygen
 - f. If the patient is alert and responding appropriately, actively rewarm
 - (1) Use warmed blankets
 - (2) Apply heat packs or hot water bottles to groin, axillary and cervical regions- use caution to avoid burns
 - (3) Turn heat up high in the patient compartment of the ambulance

- (4) Provide warm clear liquids if conscious and not vomiting
 - g. If the patient is unresponsive or not responding appropriately, rewarm passively
 - (1) Use warmed blankets
 - (2) Turn heat up high in the patient compartment of the ambulance
 - h. Do not allow the patient to eat or drink stimulants
 - i. Do not massage extremities
 - j. Assess pulses for 30-45 seconds before starting CPR
 - k. Rapid transport
- III. Heat exposure
- A. Predisposing factors
 - 1. Environmental
 - a. High ambient temperature reduces the body's ability to lose heat by radiation
 - b. High relative humidity reduces the body's ability to lose heat through evaporation
 - 2. Exercise/activity
 - a. Can lose more than 1 liter of sweat per hour
 - b. Loss of electrolytes (sodium, chloride and fluid through sweat)
 - 3. Age
 - a. Geriatrics
 - (1) Poor thermoregulation
 - (2) Medications
 - (3) Lack mobility - cannot escape hot environment
 - b. Pediatrics
 - (1) Poor thermoregulation
 - (2) Cannot remove own clothing
 - 4. Pre-existing illness or conditions
 - a. Heart disease
 - b. Dehydration
 - c. Obesity
 - d. Fever
 - e. Fatigue
 - f. Diabetes
 - g. Alcohol use
 - B. Heat cramps – painful muscle spasms brought on by vigorous exercise in a hot environment; due to changes in body's electrolytes; dehydration and excessive sweating affect normal muscle function
 - 1. Signs and symptoms
 - a. Severe muscle spasms
 - b. Usually affect leg or abdominal muscles
 - 2. Management
 - a. Remove patient from hot environment

- b. Rest muscles
 - c. Administer oxygen
 - d. Replace fluids by mouth
 - e. Cool patient with water spray or mist
- C. Heat exhaustion – caused by hypovolemia that results from dehydration (loss of fluids and electrolytes) from heavy sweating; most common, serious heat-related illness
- 1. Signs and symptoms
 - a. Muscle cramps
 - b. Weakness or exhaustion
 - c. Nausea and vomiting
 - d. Dry tongue and thirst
 - e. Change in level or consciousness - dizziness or faintness
 - f. Cool, clammy, ashen skin
 - g. Weak, rapid pulse
 - h. Blood pressure – may see low diastolic pressure
 - i. Normal or slightly elevated body temperature
 - 2. Management
 - a. Remove patient from hot environment
 - b. Turn AC on in back of ambulance
 - c. Administer oxygen
 - d. Loosen or remove clothing
 - e. Cool patient with water spray or mist
 - f. Place in supine position, legs elevated
 - g. Suction as needed
 - h. If patient is responsive and is not nauseated, have the patient drink water
 - i. Transport patient on side if unresponsive
- D. Heatstroke – results from exposure to excessive high temperatures, beyond body's ability to regulate; tissue damage occurs; most serious heat-related illness; untreated heatstroke results in death
- 1. Signs and symptoms
 - a. Hot, dry, flushed skin (due to extreme dehydration and malfunction of sweating mechanism)
 - b. Behavioral changes
 - c. Loss of consciousness
 - d. Rapid respirations
 - e. Pulse – rapid and strong initially, then weakens quickly
 - f. Blood pressure - falling
 - g. Seizures
 - 2. Management
 - a. Remove patient from hot environment
 - b. Turn AC on in back of ambulance
 - c. Remove clothing
 - d. Administer oxygen
 - e. Apply cool packs to neck, groin and armpits

- f. Keep skin wet by applying water by sponge or wet towels
 - g. Fan aggressively
 - h. Transport immediately
- IV. Submersion incidents
- A. Drowning
- 1. Ensure the safety of the rescue personnel
 - 2. Suspect possible spine injury if diving accident is involved or unknown
 - 3. Suspect possible hypothermic conditions if immersion in cold water or an open body of water
 - 4. Consider length of time in cold water drowning. Any pulseless, non-breathing patient who has been submerged in cold water should be resuscitated. Check pulses for a full 60 seconds.
 - 5. Management
 - a. In-line immobilization and removal from water with backboard if spine injury is suspected and patient is responsive
 - b. If there is no suspected spine injury, place patient on left side to allow water, vomitus and secretions to drain from upper airway
 - c. Manage gastric distension
 - d. Suction as needed
 - e. Administer oxygen
 - f. Be prepared to provide resuscitation
 - 6. Types of drowning
 - a. Fresh water
 - b. Salt water
 - 7. Pathophysiology
 - a. Little difference in patient lungs regardless of type of water submersion
 - b. Submersion in cold water results in better survival than warm water
 - c. Age is a factor due to cardiovascular health
 - d. Duration under water effects outcome
 - e. Submersion in very cold water can produce cardiac disturbances
 - f. Hypoxia from submersion is major factor in death
 - g. Diving in shallow water can cause spinal trauma
 - h. Prolonged hypoxia causes death of brain tissue
 - 8. Signs and symptoms
 - a. Airway – obstructed with water immediately after rescue
 - b. Breathing
 - (1) Coughing
 - (2) Agonal breaths if prolonged submersion
 - (3) Respiratory arrest
 - c. Circulation

- (1) Cardiac arrest possible
 - (2) Cyanosis
 - (3) Skin cold to touch
9. Assessment, specific to drowning
- a. Airway, ventilation, and oxygenation
 - (1) Oxygen saturation may be difficult to obtain if patient is cold
 - (2) Use spinal precautions when opening airway to assess if risk of spinal trauma is possible
 - (3) Auscultate breath sounds
10. Management
- a. Airway, ventilation, and oxygenation
 - (1) Suction and maintain open airway
 - (a) Anticipate vomiting
 - (b) Position lateral recumbent if no risk of spinal injury
 - (2) Ventilate with bag-mask if impaired ventilation or respiratory arrest
 - (3) Administer oxygen by non-rebreather mask if breathing is adequate
 - b. Circulation
 - (1) If cardiac arrest is present, refer to current American Heart Association guidelines
 - (2) Defibrillate with AED if indicated (refer to current American Heart Association guidelines)
 - c. Rapid transport - all patients who had submersion injury with any report of signs and symptoms during or after submersion need transport to appropriate facility
- B. Diving emergencies
1. Mechanism of Injury
 - a. SCUBA diving at greater depths for long periods of time
 - b. Repeated dives at depth on same day
 2. Pathophysiology
 - a. Diver remains at depth too long
 - b. Compressed air in blood expands upon ascent, turning into bubbles, which obstruct blood flow
 - c. Dysbarism—signs and symptoms related to changes in barometric pressure (caused by diving and high-altitude climbing)
 3. Signs and symptoms
 - a. Occur after patient raises to the surface too fast
 - (1) Cyanosis
 - (2) Cough
 - (3) Respiratory distress
 - (4) Pain in joints

4. The Diver Alert Network (DAN) - resource for management of diving accident patients
5. Decompression sickness
 - a. Caused by ascending too quickly or flying within twelve hours of diving
 - b. Most often occurs within 3 hours of incident but may occur up to 48 hours after
 - c. Signs and symptoms
 - (1) Personality changes
 - (2) Fatigue
 - (3) Muscle and joint pain ("bends")
 - (4) Skin blotching, mottling or rash
 - (5) Numbness and paralysis
 - (6) Choking
 - (7) Labored breathing
 - (8) Intoxicated appearance (e.g. staggering gait)
 - (9) Chest pain
 - (10) Collapse and unconsciousness
6. Air embolism
 - a. Caused by diver holding their breath due to inexperience, equipment failure, underwater emergencies, or to conserve air
 - b. Gases leave a damaged lung and enter the bloodstream
 - c. Signs and symptoms
 - (1) Blurred vision
 - (2) Chest pains
 - (3) Numbness and tingling
 - (4) Weakness/paralysis
 - (5) Frothy blood at mouth and nose
 - (6) Convulsions
 - (7) Unconsciousness occurs rapidly
 - (8) Respiratory or cardiac arrest
7. Management considerations
 - a. Airway patency
 - b. Consider spinal immobilization
 - c. Oxygen administration, high flow
 - d. Rapid transport to specialized facility (hyperbaric chamber for recompression therapy) may be needed
 - e. Maintain normal body temperature
 - f. Position patient supine or on side
 - g. Transport dive gear with patient
- V. Bites, stings and envenomations
 - A. Injuries of concern
 1. Spider bites
 2. Snake bites
 3. Hymenoptera (bees, wasps, ants, yellow jackets)

- B. Pathophysiology
 - 1. Spider bites (black widow) – inject neurotoxins
 - 2. Snake bites – rattlesnake
 - a. Toxins affect blood and nervous system; localized systemically
 - b. Patient age and weight cause different effects
 - c. Amount of toxin injected is related to toxicity
 - d. Initial 6-8 hours of care is essential
 - 3. Hymenoptera
 - a. Cause allergic reactions in sensitized (allergic) people
 - b. May lead to an anaphylactic response
- C. Signs and symptoms
 - 1. Spider bite (black widow)
 - a. Localized swelling initially
 - b. Chest or abdominal pain may occur depending on bite site
 - c. Serious in children, may be fatal
 - 2. Rattlesnake bite
 - a. Time of bite to provision of care is important
 - b. Pain at site
 - c. Progressive weakness
 - d. Nausea and vomiting
 - e. Seizures
 - f. Vision disturbances
 - g. Altered levels of consciousness
 - 3. Bee, wasp, and other stings
 - a. Pain at site
 - b. Swelling
 - c. Signs of allergic reaction
 - d. Signs of anaphylaxis
- D. General Management
 - 1. Wash area gently
 - 2. Remove jewelry from injured area before swelling begins, if possible
 - 3. Place injection site slightly below the level of the patient's heart
 - 4. Observe for development of signs and symptoms of an allergic reaction
- E. Bite/sting specific management
 - 1. Spider bite (black widow)
 - a. Clean wound with soap and water
 - b. Apply ice pack to area of bite
 - c. Transport immediately with supportive care
 - 2. Rattlesnake bite
 - a. Note time of bite
 - b. Slow venous return
 - c. Keep patient calm
 - d. Immobilize extremity

- e. Position extremity
 - f. Clean bite site with soap and water
 - g. Identify snake if possible
 - h. Do not apply cold
 - i. Consult medical direction regarding use of constricting band
3. Bees, wasps, and other stings
- a. Remove stinger or venom sac
 - (1) Scrape stinger out; e.g. with edge of card
 - (2) Avoid using tweezers or forceps as these can squeeze venom from the venom sac into the wound
 - b. If anaphylaxis develops follow protocol

MODULE 6

Trauma

Lesson 6-7

Special Considerations in Trauma

OBJECTIVES

OBJECTIVES LEGEND

C=Cognitive P=Psychomotor A=Affective

1 = Knowledge level

2 = Application level

3 = Problem-solving level

COGNITIVE OBJECTIVES

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

- 6-7.1 Discuss unique considerations for pregnant patient involved in trauma. (C-2)
- 6-7.2 Discuss special anatomy, physiology and pathophysiology considerations for the pregnant trauma patient. (C-2)
- 6-7.3 Describe unique types of injuries found in the pregnant trauma patient. (C-2)
- 6-7.4 Describe assessment considerations for pregnant trauma patients. (C-2)
- 6-7.5 Discuss unique management considerations for the pregnant trauma patient. (C-2)
- 6-7.6 Discuss special anatomy, physiology and pathophysiology considerations for the pediatric trauma patient. (C-2)
- 6-7.7 Discuss unique considerations for the pediatric trauma patient. (C-2)
- 6-7.8 Compare the unique anatomy of the pediatric patient versus the adult patient involved in trauma. (C-2)
- 6-7.9 Describe assessment considerations for pediatric trauma patients. (C-2)
- 6-7.10 Discuss unique management considerations for the pediatric trauma patient. (C-2)
- 6-7.11 Discuss special anatomy, physiology and pathophysiology considerations for the geriatric trauma patient. (C-2)
- 6-7.12 Describe assessment considerations for geriatric trauma patients. (C-2)
- 6-7.13 Discuss unique management considerations for the geriatric trauma patient. (C-2)
- 6-7.14 Define multi-system trauma. (C-1)
- 6-7.15 Discuss principals of out-of-hospital trauma care. (C-2)
- 6-7.16 Discuss critical thinking in multi- system trauma care. (C-2)

AFFECTIVE OBJECTIVES

No affective objectives identified.

PSYCHOMOTOR OBJECTIVES

No psychomotor objectives identified.

PRESENTATIONDeclarative (What)

- I. **Trauma in pregnancy**
 - A. **Special unique considerations for pregnant patient involved in trauma**
 1. **Mechanism of injury**
 - a. **Pregnant patients can sustain all types of trauma**
 - b. **Susceptible to falls and physical abuse**
 2. **Fetal considerations – trauma to an expectant mother can have effects on fetal health**
 - B. **Special anatomy, physiology, and pathophysiology considerations**
 1. **Cardiovascular**
 - a. **Increase to total vascular volume**
 - b. **Increase in maternal heart rate in third trimester**
 - c. **Shock in a third trimester patient may be difficult to detect**
 - d. **Third trimester fetus size can affect venous return in patients lying flat on their backs**
 - e. **Decreased gastrointestinal motility increases risk of vomiting and aspirations after trauma**
 - C. **Unique types of injuries and conditions of concerns for pregnant patients involved in trauma**
 1. **Fetal distress due to hypoxia or hypovolemia**
 2. **Separation of the placenta from the uterine wall**
 - a. **Abdominal pain**
 - b. **Vaginal bleeding often present**
 - c. **High risk of fetal death**
 3. **Fetal injury from penetrating trauma**
 4. **Seat belts**
 5. **Cardiac arrest due to trauma**
 - D. **Unique assessment considerations for pregnant patients involved in trauma**
 1. **Two patients to consider**
 - a. **Mother**
 - (1) **Immobilize and tilt the long spine board to the left if spinal injury is suspected**
 - (2) **Internal blood loss is difficult to assess as signs of shock are masked**
 - (3) **Increased risk of aspiration from decreased gastrointestinal motility**
 - b. **Fetus**
 - (1) **Size of fetus is important (number of weeks pregnant)**
 - (2) **Difficult to assess so treat mother aggressively if severe trauma**
 - E. **Unique management considerations for the pregnant patient involved in trauma**
 1. **Airway, ventilations, and oxygenation**

- a. Anticipate vomiting – have suction available
 - b. Assure bilateral breath sounds are present
 - c. Keep oxygenation levels high (100%) – administer oxygen by non-rebreather mask
 - d. Assist ventilations if inadequate
 2. Circulation
 3. Transport considerations
 - a. Transport on left side
 - b. Major trauma may need ALS intercept or air medical resources
 - c. Trauma centers – inform them that pregnant patient is involved in the trauma
- II. Trauma in the pediatric patient
- A. Special unique considerations for the pediatric patient involved in trauma
 1. Vehicle crashes
 2. Pedestrian versus vehicle collisions
 3. Drowning
 4. Burns
 5. Falls
 6. Penetrating trauma
 - B. Unique anatomy, physiology, and pathophysiology considerations of injured pediatric patients
 1. Heavy head with weak neck muscles in children increases risk of cervical spine injury
 2. Chest wall flexibility produces flail chest
 - C. Unique assessment considerations for a pediatric patient who has sustained trauma
 1. Pediatric assessment triangle
 - a. Appearance
 - b. Work of breathing
 - c. Circulation
 2. Airway, ventilation, oxygenation
 - a. Respiratory rates vary by age
 - b. Accessory muscle use more prominent during respiratory distress
 3. Vital signs
 - a. Assess brachial pulse in infants
 - b. Pulse rate vary by age
 - c. Slow pulse rate indicates hypoxia
 - d. Blood pressure for age 3 or younger unreliable
 - e. Blood pressure varies by age
 - f. Normal blood pressure may be present in compensated shock
 - D. Unique management considerations for pediatric patients involved in trauma
 1. Manage hypovolemia and shock as for adults

2. Shaken baby syndrome may cause brain trauma
 3. Prevent hypothermia in shock
 4. Transport to appropriate facility
 5. Pad beneath child from shoulders to hips during cervical immobilization to prevent flexion of the neck
 6. Ventilate bradycardic pediatric patient
- III. Trauma in the geriatric patient
- A. Special considerations for geriatric patients involved in trauma
 1. Vehicle crashes
 2. Pedestrian versus vehicle collisions
 3. Fall
 4. Burns
 5. Penetrating trauma
 6. Elder abuse
 - B. Unique anatomy, physiology, and pathophysiology considerations of injured geriatric patients
 1. Changes in pulmonary, cardiovascular, neurologic, and musculoskeletal systems make older patients susceptible to trauma
 2. Circulation changes lead to inability to maintain normal vital signs during hemorrhage, blood pressure drops sooner
 3. Multiple medications are more common and may affect
 - a. Assessment, especially vital signs
 - b. Blood clotting
 4. Brain shrinks leading to higher risk of cerebral bleeding following head trauma
 5. Skeletal changes cause curvature of the upper spine that may require padding during spinal immobilization
 6. Loss of strength, sensory impairment, and medical illness increase risk of falls
 - C. Unique assessment considerations for injured geriatric patients
 1. Airway
 - a. Dentures may cause airway obstruction
 - b. May have decrease in cough reflex so suctioning is important
 - c. Curvature of the spine may require padding to keep patient supine
 2. Breathing
 - a. Use of pulse oximetry to monitor oxygenation
 - b. Minor chest trauma can cause lung injury
 3. Circulation
 - D. Unique management considerations for injured geriatric patients
 1. Suctioning is important in elderly due to decrease cough reflex
 2. Decrease muscle size in the abdomen may mask abdominal trauma
 3. Prevent hypothermia

4. Broken bones are common – traction splints are not used to treat hip fractures
 5. Falls leading to trauma must be investigated as to the reason for the fall
- IV. Trauma in the cognitively impaired patient
- A. Unique considerations for injured cognitively impaired patients
 1. Types of cognitive impairment
 - a. Alzheimer's disease
 - b. Vascular dementia
 - c. Down's syndrome
 - d. Autistic disorders
 - e. Brain injury
 - f. Stroke
 2. Mechanism of injury – cognitively impaired patients are more susceptible to trauma
 - B. Unique anatomy, physiology, and pathophysiology considerations for injured cognitively impaired patients
 1. Sensory loss related to aging and disease may increase risk of injury and alter the patient's response to injury
 2. Musculoskeletal strength due to aging or impairment
 3. Memory loss with Alzheimer's disease with alter patient assessment
 4. Cardiovascular changes with dementia
 - C. Unique assessment consideration for cognitive impaired patients involved in trauma
 1. Poor historians of past medical history or events of trauma
 2. Pain perception may be altered
 3. Psychological implications of trauma may be different
 4. Patient may be bed ridden or under nursing home care
 - D. Unique assessment considerations for cognitive impaired patients involved in trauma
 1. Cognitively impaired patient special care
 2. Involve usual care givers in emergency treatment
- V. Multi-system trauma
- A. Definition
 1. More than one body system or organ involved
 2. Has a high level of morbidity and mortality
 3. Treatment involves a team of healthcare specialists
 - B. The golden principles of out-of-hospital trauma care
 1. Safety of rescue personnel and patient
 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 maintain cervical spinal immobilization

6. Support ventilation and oxygenation – oxygen saturation greater than 95 percent
 7. Control external hemorrhage
 8. Shock therapy
 - a. Maintain normal body temperature
 - b. Splint musculoskeletal injuries
 9. Maintain spinal immobilization on a long spine board
 - a. Standing patients
 - b. Sitting patients
 - c. Rapid transport considerations
 - d. Prone patients
 - e. Supine patients
 10. Transport considerations
 - a. Golden period
 - b. Closest appropriate facility
 - c. 'Platinum 10 minutes'
 11. Obtain medical history
 12. Secondary survey after treatment of life threats
- C. Critical thinking in multi-system trauma care
1. Airway, ventilation, and oxygenation are key elements to success
 - a. Airway must be opened and clear throughout care
 - b. Adequate ventilation must occur—patients with low minute volume need assisted ventilation
 - c. Administration of high concentrations of oxygen
 2. Oxygenation cannot occur when patients are bleeding profusely
 - a. Stop arterial bleeding rapidly
 - b. Consider use of tourniquets if severe extremity bleeding cannot be controlled with direct pressure
 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:
 - (1) Control arterial bleeding in an awake patient first
 - (2) Much care can be done en route
 4. Rapid transport is essential
 - a. The definitive care for multi-system trauma may be surgery which cannot be done in the field
 - b. On scene time is critical and should not be delayed
 - c. Rapid extrication should be considered for critically injured patients
 - d. Use of advanced life support intercept and air medical resources in a multi-trauma patient should be highly considered
 - e. Early notification of hospital resources is essential
 - f. Transport to the appropriate facility is critical – know your local trauma system capabilities

5. Backboards – serve as entire body splints when patients are appropriately secure in unstable patients
6. Personal safety
 - a. Most important when arriving on scene, and throughout care, an injured EMT cannot provide care
 - b. Be sure to assess your environment
 - (1) Passing automobiles
 - (2) Hazardous situations
 - (3) Hostile environments
 - (4) Unsecured crime scenes
 - (5) Suicide patients who may become homicidal
7. Experience
 - a. Do not develop “tunnel” vision by focusing on patients who complain of pain and are screaming for your help while other quiet patients who may be hypoxic or bleeding internally cannot call out for help because of decrease in level of consciousness
 - b. Sometimes an obvious injury does not have the most potential for harm
 - c. Trauma care is a leading cause of death of young people. It is essential to keep important care principle in mind during management

MODULE 6

Trauma

Lesson 6-8

Practical Lab: Trauma

OBJECTIVES

OBJECTIVES LEGEND

C=Cognitive P=Psychomotor A=Affective

1 = Knowledge level

2 = Application level

3 = Problem-solving level

COGNITIVE OBJECTIVES

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

Demonstrate the cognitive objectives of Lesson 6-1: Trauma Overview.

Demonstrate the cognitive objectives of Lesson 6-2: Bleeding.

Demonstrate the cognitive objectives of Lesson 6-3: Soft Tissue Injuries and Burns, External Injuries to the Head, Face and Neck, Injuries to the Chest, Abdomen and Genitalia.

Demonstrate the cognitive objectives of Lesson 6-4: Orthopedic Trauma.

Demonstrate the cognitive objectives of Lesson 6-5: Nervous System Head and Spine.

Demonstrate the cognitive objectives of Lesson 6-6: Environmental Emergencies.

Demonstrate the cognitive objectives of Lesson 6-7: Special Considerations in Trauma.

AFFECTIVE OBJECTIVES

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

Demonstrate the affective objectives of Lesson 6-1: Trauma Overview.

Demonstrate the affective objectives of Lesson 6-2: Bleeding.

Demonstrate the affective objectives of Lesson 6-3: Soft Tissue Injuries and Burns, External Injuries to the Head, Face and Neck, Injuries to the Chest, Abdomen and Genitalia.

Demonstrate the affective objectives of Lesson 6-4: Orthopedic Trauma.

Demonstrate the affective objectives of Lesson 6-5: Nervous System Head and Spine.

Demonstrate the affective objectives of Lesson 6-6: Environmental Emergencies.

Demonstrate the affective objectives of Lesson 6-7: Special Considerations in Trauma.

PSYCHOMOTOR OBJECTIVES

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

Demonstrate the psychomotor objectives of Lesson 6-1: Trauma Overview.

Demonstrate the psychomotor objectives of Lesson 6-2: Bleeding.

Demonstrate the psychomotor objectives of Lesson 6-3: Soft Tissue Injuries and Burns, External Injuries to the Head, Face and Neck, Injuries to the Chest, Abdomen and Genitalia.

Demonstrate the psychomotor objectives of Lesson 6-4: Orthopedic Trauma.

Demonstrate the psychomotor objectives of Lesson 6-5: Nervous System Head and Spine.

Demonstrate the psychomotor objectives of Lesson 6-6: Environmental Emergencies.

Demonstrate the psychomotor objectives of Lesson 6-7: Special Considerations in Trauma.

MODULE 6

Trauma

Lesson 6-9

Evaluation: Trauma

OBJECTIVES

OBJECTIVES LEGEND

C=Cognitive P=Psychomotor A=Affective

1 = Knowledge level

2 = Application level

3 = Problem-solving level

COGNITIVE OBJECTIVES

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

Demonstrate knowledge of the cognitive objectives of Lesson 6-1: Trauma Overview.

Demonstrate knowledge of the cognitive objectives of Lesson 6-2: Bleeding.

Demonstrate knowledge of the cognitive objectives of Lesson 6-3: Soft Tissue Injuries and Burns, External Injuries to the Head, Face and Neck, Injuries to the Chest, Abdomen and Genitalia.

Demonstrate knowledge of the cognitive objectives of Lesson 6-4: Orthopedic Trauma.

Demonstrate knowledge of the cognitive objectives of Lesson 6-5: Nervous System Head and Spine.

Demonstrate knowledge of the cognitive objectives of Lesson 6-6: Environmental Emergencies.

Demonstrate knowledge of the cognitive objectives of Lesson 6-7: Special Considerations in Trauma.

AFFECTIVE OBJECTIVES

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

Demonstrate knowledge of the affective objectives of Lesson 6-1: Trauma Overview.

Demonstrate knowledge of the affective objectives of Lesson 6-2: Bleeding.

Demonstrate knowledge of the affective objectives of Lesson 6-3: Soft Tissue Injuries and Burns, External Injuries to the Head, Face and Neck, Injuries to the Chest, Abdomen and Genitalia.

Demonstrate knowledge of the affective objectives of Lesson 6-4: Orthopedic Trauma.

Demonstrate knowledge of the affective objectives of Lesson 6-5: Nervous System Head and Spine.

Demonstrate knowledge of the affective objectives of Lesson 6-6: Environmental Emergencies.

Demonstrate knowledge of the affective objectives of Lesson 6-7: Special Considerations in Trauma.

PSYCHOMOTOR OBJECTIVES

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

Demonstrate knowledge of the psychomotor objectives of Lesson 6-1: Trauma Overview.

Demonstrate knowledge of the psychomotor objectives of Lesson 6-2: Bleeding.

Demonstrate knowledge of the psychomotor objectives of Lesson 6-3: Soft Tissue Injuries and Burns, External Injuries to the Head, Face and Neck, Injuries to the Chest, Abdomen and Genitalia.

Demonstrate knowledge of the psychomotor objectives of Lesson 6-4: Orthopedic Trauma.

Demonstrate knowledge of the psychomotor objectives of Lesson 6-5: Nervous System Head and Spine.

Demonstrate knowledge of the psychomotor objectives of Lesson 6-6: Environmental Emergencies.

Demonstrate knowledge of the psychomotor objectives of Lesson 6-7: Special Considerations in Trauma.

MODULE 7

Special Patient

Populations

Lesson 7-1

Pediatrics

OBJECTIVES

OBJECTIVES LEGEND

C=Cognitive P=Psychomotor A=Affective

1 = Knowledge level

2 = Application level

3 = Problem-solving level

COGNITIVE OBJECTIVES

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

- 7-1.1 Explain why pediatric patients need varying approaches to assessment and care. (C-3)
- 7-1.2 Identify the developmental considerations for the following age groups: (C-1)
 - infants
 - toddlers
 - pre-school
 - middle childhood
 - adolescent
- 7-1.3 Identify the anatomical and physiological differences to consider in the care of the pediatric patient in the following areas: (C-1)
 - Head and airway
 - Chest and lung
 - Abdomen
 - Extremities
 - Integumentary system
 - Respiratory system
 - Circulatory system
 - Nervous system and spinal column
- 7-1.4 Consider the metabolic differences in providing care to the pediatric patients. (C-3)
- 7-1.5 Describe general considerations of the assessment process utilized for the pediatric patient (C-3)
- 7-1.6 Summarize the components of the pediatric assessment triangle (PAT) (C-3)
- 7-1.7 Describe the hands-on assessment of the ABCs (C-1)
- 7-1.8 Identify the additional assessment techniques utilized in a SAMPLE history and secondary assessment. (C-1)
- 7-1.9 List specific pathophysiology, assessment and management of the following emergencies encountered in the pediatric patient: (C-1)
 - Respiratory distress
 - Shock
 - Neurological
 - Gastrointestinal

Toxicology
SIDS
Trauma

- 7-1.10 Predict the emotional reaction an EMT may have during and after a pediatric emergency. (C-3)

AFFECTIVE OBJECTIVES

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

- 7-1.11 Explain the importance of including family members in the assessment and management of a pediatric patient. (A-1)
- 7-1.12 Explain the rationale for having knowledge and skills appropriate for dealing with a pediatric patient. (A-3)
- 7-1.13 Attend to the feelings of the family when dealing with an ill or injured geriatric or pediatric patient. (A-1)
- 7-1.14 Understand the provider's own response (emotional) to caring for pediatric patients. (A-1)

PSYCHOMOTOR OBJECTIVES

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

- 7-1.15 Conduct a patient interview for pediatric patient. P-1)
- 7-1.16 Demonstrate the assessment of a pediatric patient. (P-1,2)

PRESENTATION

Declarative (What)

- I. The EMT needs to be aware of the differences in the pediatric patient
 - A. Medical needs vary with age
 - B. Injury patterns vary with age
 - C. Approaches to assessment vary
 - D. Provision of emergency medical care will require special knowledge of the pediatric patient
- II. Growth and Development
 - A. Infancy
 1. Birth to two months
 - a. Physical development
 - (1) Control= gazing at faces, turning their heads, sucking
 - (2) Sleep accounts for up to 16 hours a day
 - (3) Relatively large surface area which predisposes them to hypothermia
 - b. Cognitive development
 - (1) Crying is form of communication- anger, pain
 - (2) May cry due to hunger or need to be changed
 - (3) When needs have been met, persistent crying can be a sign of significant illness
 - c. Care considerations

- (1) Consider cause of persistent crying
 - (2) Though sleeping, should arouse easily
 - (3) Inability to arouse should be considered an emergency
 - (4) Head control is limited
2. Two to six months
- a. Physical development
 - (1) Voluntarily smile and increase eye contact
 - (2) Uses both hands to examine objects
 - (3) 70 percent of babies sleep through the night by six months
 - (4) Intentional rolling over begins
 - (5) Begin to hold their heads up
 - (6) Recognizes familiar faces
 - b. Cognitive development
 - (1) Increased awareness of surroundings
 - (2) Explore bodies
 - c. Care considerations
 - (1) Persistent crying or irritability can be a sign of serious illness
 - (2) Should make eye contact by 6 months
 - (3) Lack of eye contact when sick could be a sign of significant illness, depressed mental status or delayed development
3. Six to 12 months
- a. Physical development
 - (1) Sits without support
 - (2) Develops a pincer grasp; everything goes to the mouth
 - (3) Begin to crawl
 - (4) Begin getting teeth and eating soft foods
 - b. Cognitive development
 - (1) Begin babbling and learning first words
 - (2) Develop "separation anxiety" from parents-may protest, show despair or withdrawal during first year
 - c. Care considerations
 - (1) Persistent crying or irritability can be a sign of serious illness
 - (2) At risk for foreign body aspiration and poisoning due to exploration of environment with their mouths
 - (3) Separation anxiety can be lessened by keeping the child and parent together during evaluation
 - (4) Involve the parent in the treatment, if appropriate
 - (5) Crawling and walking increase exposure to physical dangers
4. Vital signs-birth to 1 year

- a. Initial heart rate 100-160, settling around 120 beats per minute
 - b. Initial respiratory rate 40-60, slowing to 20-30 by 1 year of age, tidal volume increases.
 - c. Blood pressure-average systolic increases from 70 at birth to 90 at 1 year.
 - d. Temperature ranges from 98-100 degrees Fahrenheit.
- B. Toddler Years
- 1. Twelve to 18 months
 - a. Physical development
 - (1) Begin to walk
 - (2) Explores their environment
 - b. Cognitive development
 - (1) Limits older children and parents
 - (2) Knows major body parts
 - (3) Knows four to six words
 - c. Care considerations
 - (1) Persistent crying or irritability can be a sign of serious illness
 - (2) May not be able to grind up food before swallowing, due to lack of molars, increasing risk of food aspiration
 - (3) Increased mobility increases exposure to physical dangers and injury
 - (4) Distracting a child with a flashlight or toy may aid in physical exam
 - 2. Eighteen to 36 months
 - a. Physical development
 - (1) Improved gait and balance
 - (2) Begin to run and climb
 - b. Cognitive development
 - (1) Begin to understand cause and effect
 - (2) Begin to label objects
 - (3) Ten to 15 words becomes 100 words by 24 months
 - c. Emotional development
 - (1) Dislikes separation from parents
 - (2) Attachment to a special object, like a blanket
 - (3) Fear pain, may consider this punishment
 - (4) Does not like to be touched
 - d. Care considerations
 - (1) Persistent crying or irritability can be a sign of serious illness
 - (2) Allow a child to hold objects of importance to them (e.g. blanket)
 - (3) Use shoulder rolls to limit flexion of the neck when bag-valve-mask ventilating or intubating

- (4) Painful procedures make lasting impression
 - (5) May dislike being touched and having clothing removed.
3. Vital signs
 - a. Heart rate 80-130 beats per minute
 - b. Respiratory rate 20-30 breaths per minute
 - c. Systolic blood pressure-70-100mmHg
 - d. Temperature- 96.8 to 99.6 degrees Fahrenheit
- C. Preschool Years (3-6 Years)
1. Physical development
 - a. Normal walking and running
 - b. Begin throwing, catching, kicking
 - c. Toilet training
 2. Cognitive development
 - a. Most rapid increase in language
 - b. Magical thinking
 - c. Rules tend to be absolute
 - d. Irrational fears
 3. Emotional development
 - a. Learn acceptable behaviors
 - b. Tantrums around control issues
 - c. Modesty developing
 - d. Fear of permanent injury
 4. Implications for the health care provider
 - a. Rapid increase in language enhances ability to understand care explanations
 - b. Respect modesty
 - c. Foreign body airway obstruction risk continues to be high
 - d. Appealing to their magical thinking may allow you to do more (e.g., this magic smoke will help you breathe better [nebulizer])
 - e. Fear of pain that may be caused by treatment
 - f. Afraid of blood
 5. Vital signs
 - a. Heart rate-80-120 beats per minute
 - b. Respiratory rate-20-30 beats per minute
 - c. Systolic blood pressure-80-110 mmHg
 - d. 96.8 to 99.6 degrees Fahrenheit
- D. Middle childhood years-school age (6-12 Years)
1. Physical development
 - a. Loss of baby teeth
 - b. Permanent teeth erupt
 2. Cognitive development
 - a. Think logically
 - b. School important
 3. Emotional development

- a. Popularity and peer pressure important
 - b. Children with chronic illness or disabilities very self-conscious
 - c. Begin to understand that death is final
 - d. Fear of permanent injury, disfigurement
 - e. Fear of pain
 - f. Afraid of blood
4. Care considerations
 - a. Provide simple explanations for illness and treatments
 - b. Provide sense of control by giving choices if possible
 - c. Respect patient's modesty and cover after the physical exam
 - d. Ask questions about school/familiar topics to enlist cooperation
 5. Vital signs
 - a. Heart rate-70-110 beats per minute
 - b. Respiratory rate-20-30 breaths per minute
 - c. Systolic blood pressure-80-120 mmHg
 - d. Temperature-98.6 degrees Fahrenheit
- E. Adolescence (12-18 Years)
1. Physical development
 - a. Breast development in females
 - b. Body hair growth
 - c. Hormone changes
 2. Cognitive development
 - a. Ability to reason
 - b. Tend to deny real things may happen to them (auto accidents, death)
 - c. Develop morals
 3. Emotional development
 - a. Self-conscious about body image
 - b. Develop understanding regarding who they are.
 - c. Become more comfortable with self
 - d. Relationships generally transition to those of the opposite sex
 - e. Fear of permanent injury and disfigurement
 - f. Self-destructive behaviors begin-tobacco, alcohol, illicit drugs, eating disorders
 - g. Depression and suicide more common than any other age group.
 4. Care considerations
 - a. Explain things clearly and honestly as you would to an adult
 - b. Give choices when appropriate
 - c. Respect modesty and cover after the physical exam
 - d. Be honest about procedures which will cause discomfort
 - e. Address concerns and fears about the lasting effects of their injuries (especially cosmetic) and if appropriate, reassure

- f. Treat as adults, may want to be assessed away from parents or guardians.
 - g. Adolescence time of hormonal surges, emotions, and peer pressure; increases risk for substance abuse, self-endangerment, pregnancy, and dangerous sexual practices
 - 5. Vital signs
 - a. 55-105 beats per minute
 - b. Respiratory rate-12-20 breaths per minute
 - c. Blood pressure-100 to 120 mmHg
 - d. Temperature-98.6 degrees Fahrenheit
- III. Anatomy and physiology of head/airway to consider in care of pediatric patient
 - A. Head proportionally larger to body size
 - 1. Increased incidence of blunt head trauma
 - 2. Excessive heat loss may occur from head
 - 3. Securing the airway may require a towel or roll under the shoulders
 - B. Fontanelles provide information during assessment
 - 1. Posterior closes at three months
 - 2. Anterior closes between 9 and 18 months
 - 3. Bulging in an ill-appearing non-crying infant suggests increased intracranial pressure
 - 4. Sunken in an ill-appearing infant suggests dehydration.
 - C. Airway compared to other age groups
 - 1. Smaller in diameter and shorter in length
 - 2. Jaw smaller and infant's tongue larger proportionally
 - 3. Infants are obligate nose breathers until four weeks
 - 4. Tracheal cartilage is softer and more collapsible
 - 5. Epiglottis of infants and toddlers long, floppy, narrow and extends at a 45-degree angle into airway
 - D. Airway care considerations
 - 1. Essential to suction the nares of infants in respiratory distress
 - 2. Posterior displacement of the tongue may cause airway obstruction
 - 3. Smaller airways more easily obstructed by
 - a. Flexion or hyperextension
 - b. Particulate matter (including mucus)
 - c. Soft tissue swelling (injury, inflammation)
- IV. Anatomy and physiology of chest and lung to consider in care of pediatric patient
 - A. Ribs more cartilaginous and pliable
 - B. Less overlying muscle and fat to protect ribs and vital organs
 - C. Breathe primarily with their diaphragms
 - D. Thin chest wall easily transmits breath sounds
 - E. Fewer alveoli with decreased collateral ventilation during first year
 - F. Care considerations
 - 1. Effective diaphragmatic excursion essential for adequate ventilation
 - 2. Rib fractures less common due to pliability
 - 3. Rib fractures present represent significant energy transmission, must, suspect multi-system injury (e.g.pulmonary contusion)

4. Lungs prone to pneumothorax from excessive pressures while bag-mask ventilating
 5. Lung tissue fragile/prone to trauma from pressure.
 6. Infants' have immature accessory muscles, more susceptible to early fatigue
 7. Rapid respiratory rates lead to rapid heat and fluid loss
- V. Anatomy and physiology of abdomen to consider in care of pediatric patient
- A. Less-developed abdominal muscles and organs more anterior than adult
 - B. Less protection provided by rib cage
 - C. Liver and spleen proportionally larger
 - D. Care considerations
 1. Seemingly insignificant forces can cause serious internal injury
 2. Liver, spleen, and kidneys are more frequently injured
 3. Multiple organ injury common
- VI. Anatomy and physiology of extremities to consider in care of pediatric patient
- A. Bones softer
 - B. Open growth plates are weaker than ligaments and tendons
 - C. Injury to growth plate can result in length discrepancies
 - D. Care considerations require splinting as with other age groups
- VII. Anatomy and physiology of integumentary system to consider in care of pediatric patient
- A. Larger surface area to body mass ratio
 - B. Care considerations
 1. Skin more easily, quickly and deeply burned
 2. Larger surface can lead to large fluid and heat losses
 3. Hypothermia can complicate resuscitative efforts
- VIII. Anatomy and physiology of respiratory system to consider in care of pediatric patient
- A. Higher oxygen demand per kilogram of body weight (twice that of an adult)
 - B. Smaller lung oxygen reserves
 - C. Care considerations
 1. Higher oxygen demand with less reserve increases risk of hypoxia with apnea or ineffective bagging
 2. Err on using a larger bag for ventilating the pediatric patient
 3. Regardless of the size of the bag used for ventilation, use only enough force to make the chest rise slightly)
- IX. Anatomy and physiology of circulatory system to consider in care of pediatric patient.
- A. Pulse rates more rapid, may be 160 in infant to meet needs during illness and injury
 - B. Constriction of blood vessels may be profound
 - C. Larger proportional amount of circulating blood volume than adults
 - D. Care considerations
 1. Pale skin early sign of compensation
 2. BP may appear normal even during state of shock
 3. Small amount of blood loss (1 cup) may result in shock

- X. Anatomy and physiology of nervous system and spinal column to consider in care of pediatric patient
 - A. Brain tissue and vascular system more fragile and prone to bleeding from injury
 - B. Subarachnoid space is relatively smaller with less cushioning effect for brain
 - C. Pediatric brain requires nearly twice the cerebral blood flow as an adult's
 - D. Brain and spinal cord less well protected
 - E. Infant movements include strong, coordinated suck and gag, well-flexed extremities and extremities move equally when infant is stimulated.
 - F. Care considerations
 - 1. Large cerebral blood flow requirement increases risk of hypoxia
 - 2. Hypoxia and hypotension with a head injury can cause ongoing damage
 - 3. Head momentum may result in bruising and damage to the brain
 - 4. Spinal cord injuries less common
 - 5. Cervical spine injuries more commonly ligament injuries
- XI. Metabolic differences to consider in care of pediatric patient
 - A. Limited glucose stores
 - B. Newborns /infants less than one month most susceptible to hypothermia
 - C. Care considerations
 - 1. Keep the infant or child warm during treatment and transport
 - 2. Cover the head (avoiding the face) to minimize heat loss
 - 3. Newborns should not be overwarmed, as this can worsen their neurologic outcomes
- XII. Assessment
 - A. General considerations
 - 1. General impression of "sick, not sick" obtained from overall appearance
 - 2. Utilize the parent/guardian (if appropriate) comfort child
 - 3. Communication with families is an important responsibility of EMT
 - 4. Calm parent=calm child; agitated parents=agitated child
 - 5. Parents/guardians know what's normal for child
 - 6. Assessment/treatment is an ongoing process until transference of care
 - B. Assessment process
 - 1. Preparing for arrival
 - a. Assemble age-appropriate equipment
 - b. Review age-appropriate vital signs and anticipated development
 - 2. Scene size-up
 - a. Scene safety
 - b. Evaluate the scene for clues related to the chief complaint
 - (1) Alcohol and other drugs.
 - (2) Child abuse: injury consistent with history of incident
 - (3) Note position and location in which patient is found

- c. Observe and note parents'/guardians'/caregivers' interactions with the child
 - (1) Appropriately concerned, angry, or indifferent?
 - (2) Child comforted by them or scared by them?
3. Patient assessment
 - a. Pediatric assessment triangle (PAT)
 - (1) General
 - (a) Provides a 15- to 30-second assessment of the severity of the patient's illness or injury
 - (b) Use prior to addressing "the ABCs"
 - (c) Touching not necessary, just looking and listening
 - (d) Trunk to head approach may lessen anxiety
 - (2) Components
 - (a) Appearance
 - (i) Muscle tone
 - (ii) Interactiveness
 - (iii) Consolability
 - (iv) Eye contact
 - (v) Speech or cry
 - (b) Work of breathing
 - (i) Abnormal airway noise (i.e., wheeze, stridor, grunting, crowing)
 - (ii) Abnormal positioning (i.e., tripod)
 - (iii) Retractions (i.e., chest wall, nasal flaring)
 - (iv) Rate of breathing
 - (c) Circulation to the skin
 - (i) Pallor
 - (ii) Mottling
 - (iii) Cyanosis
 - (3) Possible physiologic states based upon the above three components
 - (a) Respiratory distress or failure
 - (b) Cardiovascular shock
 - (c) Cardiopulmonary failure or arrest
 - (d) Isolated head injury, ingestion, or other primary CNS abnormality
 - (e) Stable patient
 - (4) Initial triage and transport decision based on physiologic state
 - (a) Urgent—begin rapid ABCs assessment and treatment; transport once treatment has begun
 - (b) Stable patient—proceed with ABCs assessment followed by focused history and

complete physical exam; begin transport
starting potential therapies en route

4. Hands-on ABCs
 - a. Airway
 - (1) Open, remove secretions, blood, or foreign body
 - (2) Maintainable on its own, with help (jaw thrust, chin lift, oral or nasal airway), or not maintainable (in need of advanced airway care)
 - b. Breathing/oxygenation
 - (1) Respiratory rate and effort
 - (2) Auscultation for wheezes, crackles, etc.
 - (3) Oxygen saturation
 - (4) May resist oxygen mask on face
 - c. Circulation
 - (1) Heart rate
 - (2) Central and peripheral pulse quality: strong or weak
 - (3) Extremity skin temperature, capillary refill time (CRT), active bleeding
 - (4) Blood pressure (usually not assessed under age 3)
 - d. Disability
 - (1) Level of consciousness
 - (2) AVPU scale
 - (3) Assess pupils: dilated, constricted, reactive, or fixed
 - (4) Neurological motor deficit or moving all extremities equally
 - (5) Pain assessment using standardized pain scale
 - e. Exposure
 - (1) Examine for additional injuries and rashes
 - (2) Promptly cover to prevent hypothermia
5. Additional assessment
 - a. Focused history-SAMPLE appropriate for age/development
 - (1) Symptoms and duration
 - (a) Fever
 - (b) Activity level
 - (c) Recent eating, drinking, and urine output history
 - (d) History of vomiting, diarrhea, or abdominal pain
 - (e) Note any rashes
 - (2) Allergies
 - (3) Medications taking and medication allergies
 - (4) Past medical problems or chronic illnesses
 - (5) Key events leading to the injury or illness
 - b. Secondary assessment—"Head to Toe"
 - (1) Head: bruising, swelling, quality of fontanel, if present

- (2) Nose: drainage obstructing ability to breathe through nose
 - (3) Ears: drainage suggestive of trauma or infection
 - (4) Mouth: loose teeth, identifiable odors, bleeding
 - (5) Neck: abnormal bruising or swelling, inability to move neck if febrile
 - (6) Chest and back: bruises, injuries, or rashes
 - (7) Abdomen: distention, tenderness, seat belt abrasions or bruising
 - (8) Extremities: deformities, swellings, or pain on movement
 - c. Focused physical assessment
 - (1) Non-life-threatening injuries or illness
 - (2) Focused on area affected
 - d. Reassessment
 - (1) Vital signs: stable patient every 15 minutes, unstable patient every 5 minutes
 - (2) Repeat primary assessment
 - (3) Check interventions
 - e. Assess younger pediatric patient starting at feet
- XIII. Specific pathophysiology, assessment, and management
- A. Respiratory Distress
 - 1. Introduction
 - a. Epidemiology
 - b. Anatomic and physiologic differences in children (refer to earlier segment)
 - 2. Pathophysiology
 - a. Respiratory distress
 - b. Respiratory failure
 - c. Respiratory arrest
 - 3. Assessment
 - a. History
 - b. Physical findings
 - 4. Upper airway obstruction
 - a. Croup
 - b. Foreign body aspiration
 - c. Bacterial tracheitis
 - d. Epiglottitis
 - e. Tracheostomy dysfunction
 - 5. Lower airway disease and reactive airway disease
 - a. Asthma
 - b. Bronchiolitis
 - c. Pneumonia
 - d. Foreign body lower airway obstruction
 - e. Pertussis
 - 6. Management

- a. Airway positioning
 - b. Age and situation-appropriate airway clearance measures
 - c. Airway adjuncts
 - d. Oxygen
 - e. Inhaled medications
 - f. Assisted ventilation
- B. Shock
- 1. Introduction
 - a. Anatomic differences (refer to earlier section of this lesson)
 - b. Physiologic differences (refer to earlier section of this lesson)
 - 2. Pathophysiology – shock stages
 - a. Compensated
 - b. Decompensated
 - c. Irreversible
 - 3. Assessment
 - a. Obtain history
 - b. Physical findings
 - 4. Management
- C. Neurology
- 1. Introduction
 - a. Anatomic differences (refer to earlier section of this lesson)
 - b. Physiologic differences (refer to earlier section of this lesson)
 - 2. Pathophysiology
 - a. Causes of altered mental status in children can be numerous
 - 3. Assessment
 - a. Obtain history
 - b. Physical findings
 - 4. Specific Conditions
 - a. Meningitis
 - b. Seizures
 - (1) Febrile/afebrile
 - (2) Status epilepticus
 - c. Altered mental status
 - d. Closed head injury
 - (1) Bleeding inside skull
 - (2) Fractures
 - 5. Management
 - a. Seizures-consider duration and potential injuries
 - b. Altered mental status
 - (1) Assess for need to protect airway
 - (2) Assess and intervene for increased intracranial
- D. Gastrointestinal
- 1. Introduction
 - a. Anatomy differences (refer to earlier section of this lesson)
 - b. Physiologic differences (refer to earlier section of this lesson)
 - 2. Pathophysiology

- a. Vomiting
 - b. Diarrhea
 - 3. Assessment
 - a. Obtain history
 - b. Physical findings
 - E. Toxicology
 - 1. Introduction
 - a. Poisoning common in children
 - b. Patient's weight may determine effect of substance taken
 - 2. Assessment
 - a. History
 - b. Physical findings
 - c. Ingestion
 - d. Inhalation
 - F. Sudden Infant Death Syndrome (SIDS)
 - 1. Introduction
 - a. Definition of SIDS
 - b. Risk factors
 - 2. Assessment
 - a. Cardiopulmonary status
 - b. Clinical signs of death
 - c. Evaluation for signs of abuse
 - 3. Management
 - a. Local EMS criteria for death in the field
 - b. Notification of appropriate authorities
 - c. Caregiver support
 - G. Pediatric Trauma
- XIV. Provider Response
 - A. Anxiety from lack of experience with treating children as well as fear of failure
 - B. Skills can be learned and applied to children
 - C. Stress from identifying patient with their own children
 - D. Adult and pediatric patients have similarities but EMT needs to remember the differences
 - E. Infrequent pediatric calls necessitate frequent practice to maintain skill level.

MODULE 7

Special Patient

Populations

Lesson 7-2

Geriatrics

OBJECTIVES

OBJECTIVES LEGEND

C=Cognitive P=Psychomotor A=Affective

1 = Knowledge level

2 = Application level

3 = Problem-solving level

COGNITIVE OBJECTIVES

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

- 7-2.1 Explain why geriatric patients need varying approaches to assessment and care. (C-1)
- 7-2.2 Define the term “geriatrics” (C-1)
- 7-2.1 Describe the anatomical and physiological changes in the geriatric patient and pathophysiology of the following systems: (C-1)
 - Cardiovascular system
 - Respiratory system
 - Neurovascular system
 - Gastrointestinal system
 - Genitourinary system
 - Endocrine system
 - Musculoskeletal system (C-3)
- 7-2.2 Recognize the pathophysiological changes that contribute to toxicological emergencies (C-1)
- 7-2.3 List the sensory changes in the elderly (C-1)
- 7-2.4 List the common emotional and psychological reactions of the geriatric patient (C-1)

AFFECTIVE OBJECTIVES

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

- 7-2.5 Explain the importance of including family members in the assessment and management of a geriatric patient. (A-1)
- 7-2.6 Explain the rationale for having knowledge and skills appropriate for dealing with a geriatric patient. (A-3)
- 7-2.7 Attend to the feelings of the family when dealing with an ill or injured geriatric patient. (A-1)

PSYCHOMOTOR OBJECTIVES

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

- 7-2-8 Conduct a patient interview for a geriatric patient. P-1)
- 7-2-9 Demonstrate the assessment of a geriatric patient who is hearing impaired, vision impaired, confused, or unable to speak. (P-1)

PRESENTATION

- I. Importance of understanding differences in the geriatric patient
 - A. Medical needs vary with age.
 - B. Injury patterns vary with age
 - C. Approaches to assessment vary
 - D. Provision of emergency medical care will require a special knowledge of both populations.
- II. Geriatrics – the assessment and treatment of disease in a person who is 65 years or older.
 - A. The number of people over the age of 65 is increasing proportionately to the rest of the population.
 - B. Older individuals have many social and environmental concerns.
 - C. Special challenges may present when interviewing and physically assessing this patient.
- III. Anatomical and physiological changes of the cardiovascular system and pathophysiology
 - A. Cardiovascular changes in the elderly
 1. Degeneration of valves
 2. Degeneration of conduction system
 3. Vascular changes
 4. Muscular changes
 5. Stroke volume
 6. Cardiac output
 7. Dysrhythmias
 - B. Myocardial infarction
 1. Associated signs and symptoms
 - a. Recognition of the types of chest pain that occur in the elderly
 - (1) typical
 - (2) atypical
 - b. Dyspnea
 - c. Epigastric and abdominal pain
 - d. Nausea and vomiting
 - e. Fatigue
 - f. Dizziness, lightheaded, syncope
 - g. Confusion
 2. Possible changes in physical presentation
 - a. Changes in circulation
 - b. Diaphoresis, pale, cyanotic mottled skin
 - c. Adventitious or decreased breath sounds
 - d. Increased peripheral edema
 3. Assessment tools
 4. Treatment
 - a. Airway, ventilatory, and circulatory support
 - b. Oxygen with adjuncts appropriate to patient condition

- c. Evaluation of patient's response to treatment through reassessment
 - C. Heart failure – a condition caused by left and right ventricular failure with accompanying pulmonary edema
 - 1. Associated signs and symptoms
 - a. Dyspnea – on exertion and paroxysmal nocturnal dyspnea
 - b. Orthopnea
 - c. Tachypnea
 - d. Pulmonary edema
 - e. Accessory muscle use to breath
 - f. Chest Pain
 - g. Anxiety
 - h. Fatigue
 - 2. Possible changes in physical presentation
 - a. Changes in circulation
 - b. Diaphoresis and cyanosis
 - c. Adventitious breath sounds to include crackles, wheezing, and rales
 - d. Tachycardia
 - e. Hypertension early and hypotension as a late sign
 - 3. Assessment tools – blood pressures
 - 4. Treatment
 - a. Airway, ventilatory, and circulatory support
 - b. Oxygen with adjuncts appropriate to patient condition
- IV. Anatomical and physiological changes of the respiratory system and pathophysiology
 - A. Respiratory changes in the elderly
 - 1. Loss of elastic recoil in the chest wall resulting in air trapping and an increase in lung capacity and residual volume
 - 2. Loss of alveoli
 - 3. Reduction in oxygen and carbon dioxide exchange
 - 4. Inability to increase rate of respiratory effort
 - 5. Decreased cough reflex
 - 6. Decreased ability of cilia to move mucus upward
 - B. Pneumonia – infection of the lung from bacterial viral or fungal causes
 - 1. Evaluation of pathophysiology through history and possible risk factors
 - a. Institutionalized
 - b. Chronic disease processes
 - c. Immune system compromise
 - d. Chronic obstructive pulmonary disease
 - e. Cancer
 - f. Inhaled toxins
 - g. Aspiration
 - 2. Associated signs and symptoms
 - a. Exertional dyspnea

- b. Productive cough
 - c. Chest discomfort and pain
 - d. Wheezing
 - e. Headache
 - f. Nausea and vomiting
 - g. Musculoskeletal pain
 - h. Weight loss
 - i. Confusion
- 3. Possible changes in physical presentation
 - a. Changes in circulation
 - b. Cyanosis and pallor, dry skin, possible fever
 - c. Poor skin turgor, pale, dry mucosa
 - d. Tachycardia
 - e. Diminished breath sounds with adventitious noises of wheezing, rales, or rhonchi
 - f. Hypotension
 - 4. Assessment
 - a. Wheezing, rales and rhonchi
 - b. Temperature
 - c. Pulse oximetry
 - 5. Treatment
 - a. Airway, ventilatory, and circulatory support
 - b. Oxygen with appropriate adjuncts
 - c. Supportive measures
 - d. Evaluation of patient's response to treatment through reassessment
- C. Pulmonary embolism – sudden blockage of the pulmonary artery by a venous clot
- 1. Associated signs and symptoms
 - a. Sudden onset of dyspnea
 - b. Shoulder/back/chest pain
 - c. Syncope
 - d. Anxiety/apprehension
 - e. Fever
 - f. Leg pain/redness/unilateral pedal edema
 - g. Fatigue
 - h. Cardiac arrest
 - 2. Possible changes in physical presentation
 - a. Changes in circulation
 - b. Tachycardia
 - c. Adventitious noises such as wheezing, rales or decreased breath sounds
 - d. Decreased pulse oximetry reading of 70 percent or lower
 - e. Hypotension
 - 3. Assessment tools
 - a. Blood pressure

- b. Pulse oximetry
 - 4. Treatment
 - a. Airway, ventilatory, and circulatory support
 - b. Oxygen with appropriate adjunct; events may necessitate aggressive management
 - c. Respiratory and cardiac arrest management according to current American Heart Association standards or area protocol
 - d. Evaluation of patient's response to treatment through reassessment
- V. Anatomical and physiological changes of the neurovascular system and pathophysiology
 - A. Neurovascular changes in the elderly
 - 1. Atrophy of the brain tissue
 - a. Cognitive and short-term memory effects
 - b. Delayed verbal response
 - 2. Deterioration of the nervous system function in controlling
 - a. Rate and depth of breathing
 - b. Heart rate
 - c. Blood pressure
 - d. Hunger and thirst
 - e. Temperature
 - f. Sensory perception – including audio, visual, olfactory, touch, and pain
 - 3. Neuropathy
 - B. Dementia – a chronic, generally irreversible condition that causes a progressive loss of cognitive abilities, psychomotor skills, and social skills
 - 1. Demographics
 - 2. Evaluation of pathophysiology through history, and risk factors and current medications
 - a. Cerebrovascular accidents
 - b. Alzheimer's disease
 - c. Various forms of encephalitis
 - d. Alcohol
 - e. Work history with metals, organic or airborne toxins
 - 3. Known reversible causes of dementia
 - a. Drug overdose
 - b. Emotional disorders
 - c. Metabolic and endocrine disorders
 - d. Tumors
 - e. Trauma
 - f. Infections
 - g. Parkinson's disease
 - 4. Associated signs and symptoms
 - a. Progressive loss of cognitive function; short- and long-term memory problems, decreased attention span

- b. Inability to perform daily routines with decreased ability to communicate and confusion over environment
 - c. Mood often angry
 - 5. Problems associated with management of patient with dementia
 - a. Poor historian; impaired judgment
 - b. Inability to vocalize areas of pain and current symptoms
 - c. Unable to follow commands
 - d. Anxiety over movement out of home or current establishment
 - e. Anxiety and fear of treatment of current medical problems
 - C. Delirium – a sudden change in behavior, consciousness, or cognitive processes generally due to a reversible physical ailment
 - 1. Mortality rates
 - 2. Evaluation of pathophysiology through history, possible risk factors, and current medications
 - a. Intoxication or withdrawal from alcohol
 - b. Withdrawal from sedatives
 - c. Medical conditions as urinary tract infections/ bowel obstructions
 - d. Dehydration, cardiovascular disease, febrile episodes may increase risk
 - e. Hyper/hypoglycemia
 - f. Psychiatric disorders (i.e., depression)
 - g. Malnutrition/vitamin deficiencies
 - h. Environmental emergencies
 - 3. Associated signs and symptoms
 - a. Onset of minutes, hours, days
 - b. Disorganized thoughts: inattention, memory loss, disorientation
 - c. Hallucinations
 - d. Delusions
 - e. Reduced level of consciousness
 - 4. Possible changes in physical presentation
 - a. Changes in circulation
 - b. Changes in response of pupils
 - c. Changes in response to motor tests
 - d. Adventitious breath sounds
 - 5. Assessment tools
 - a. Blood pressures
 - b. Auscultation of breath sounds to detect adventitious noises
 - 6. Treatment
 - a. Airway, ventilatory, and circulatory support
 - b. Oxygen with adjuncts appropriate to patient condition
 - c. Transport/Consider ALS
- VI. Anatomical and physiological changes of the gastrointestinal system and pathophysiology

- A. Gastrointestinal (GI) changes in the elderly can be caused by:
 - 1. Dental problems
 - 2. Decrease in saliva
 - 3. Poor muscle tone of smooth muscle sphincter between esophagus and stomach can cause regurgitation leading to heartburn, and acid reflux
 - 4. Decrease in hydrochloric acid in the stomach
 - 5. Alterations in absorption of nutrients
 - 6. Slowing peristalsis causing constipation
 - 7. Rectal sphincter may become weak resulting in fecal incontinence
 - 8. Liver shrinks
 - 9. Blood flow to the liver declines
 - 10. Decrease metabolism in the liver
- B. Gastrointestinal bleeding caused by disease processes, inflammation, infection and obstruction of the upper and lower gastrointestinal tract
 - 1. Associated signs and symptoms
 - a. Hematemesis (vomiting blood)
 - b. Melena
 - c. Dyspepsia
 - d. Hepatomegaly (enlarged liver)
 - e. Jaundice
 - f. Constipation or diarrhea
 - g. Agitation, inability to find a comfortable position
 - h. Dizziness
 - 2. Possible changes in physical presentation
 - a. Changes in circulation
 - b. Pale or yellow, thin skin,
 - c. Frail musculoskeletal system
 - d. Peripheral, sacral, and periorbital edema
 - e. Hypertension
 - f. Fever
 - g. Tachycardia
 - h. Dyspnea
 - 3. Assessment tools
 - a. Blood pressures, lying, sitting, and standing noting any change of 10 mm/Hg or more lower as the patient moves to an upright position indicates an orthostatic change
 - b. Pulses, lying, sitting, and standing noting any change of 10 beats per minute more higher as the patient moves to an upright position indicates an orthostatic change
 - c. Auscultation of breath sounds
 - 4. Treatment:
 - a. Airway, ventilatory and circulatory support
 - b. Oxygen with adjuncts appropriate to patient condition
- VII. Anatomical and physiological changes of the genitourinary system and pathophysiology

- A. Genitourinary changes in the elderly
 - 1. Reduction in renal function
 - 2. 50 percent reduction in renal blood flow
 - 3. Tubule degeneration
 - 4. Decreased bladder capacity
 - 5. Decline in sphincter muscle control
 - 6. Decline in voiding senses
 - 7. Increase in nocturnal voiding
 - 8. Benign prostatic hypertrophy
- VIII. Anatomical and physiological changes of the endocrine system and pathophysiology
 - A. Endocrine changes in the elderly
 - 1. Decreased metabolism
 - 2. Blood glucose imbalances
 - B. Hyperosmolar Hyperglycemic Nonketotic Coma (HHNC) - a diabetic complication resulting in high blood glucose levels that do not cause ketosis; leads to diuresis and dehydration
 - 1. Associated signs and symptoms
 - a. Hyperglycemia
 - b. Polydipsia
 - c. Dizziness
 - d. Confusion
 - e. Altered mental status
 - f. Seizures
 - 2. Possible changes in physical presentation
 - a. Tachycardia
 - b. Hypotension
 - c. Poor skin turgor,
 - d. Pale skin
 - e. Dry, oral mucosa
 - f. Shock
 - g. Blood glucose levels greater than 500 mg/dL
 - 3. Assessment tools
 - a. Blood pressures
 - b. Distal pulses
 - c. Auscultation of breath sounds
 - d. Temperature
 - e. Blood glucose measurement
 - 4. Treatment
 - a. Airway, ventilatory, and circulatory support
 - b. Oxygen with adjuncts appropriate to patient condition
- IX. Anatomical and physiological changes of the musculoskeletal system and pathophysiology
 - A. Musculoskeletal changes in the elderly
 - 1. Atrophy of muscles and muscle wasting
 - 2. Degenerative changes and loss of bone

3. Loss of strength
 4. Degenerative changes in joints
 5. Loss of elasticity in ligaments and tendons
 6. Thinning of cartilage and thickening of synovial fluid
- B. Osteoporosis is a bone disease that decreases bone density
- X. Toxicological emergencies
- A. Pathophysiological changes that cause the elderly to be susceptible to toxicity
1. Decreased kidney function
 2. Altered gastrointestinal absorption
 3. Decrease vascular flow in the liver altering metabolism and excretion
- B. Non-compliance of medication can occur from financial inability, a motor inability to open caps, impaired cognitive, vision and hearing ability; EMTs should check prescription dates and number of pills available to assess compliance of medication use
- C. Polypharmacy is the use of multiple medications, often prescribed by different doctors that can cause adverse reactions in the patient
- D. Adverse reactions occur when a drug or drugs taken together change the pharmacokinetics or pharmacodynamics in the body
- XI. Sensory changes in the elderly
- A. Vision
1. Decreased visual acuity – inability to accommodate
 2. Inability to differentiate colors
 3. Decreased night vision
 4. Decreased tear production
 5. Development of cataracts
 6. Disease processes
 - a. Glaucoma
 - b. Macular degeneration
 - c. Retinal detachment
- B. Hearing
1. Degeneration of hearing
 2. Inability to hear high frequency sounds
 3. Use of hearing aids
- C. Pain Perception
1. Alteration of pain perception
 2. Inability to differentiate hot from cold
- XII. Common emotional and psychological reactions of the geriatric patient
- A. Most often are presentations of physical changes from illness or injury
- B. Need evaluations at a medical facility

MODULE 7

Special Patient

Populations

Lesson 7-3

Patients with Special Challenges

OBJECTIVES

OBJECTIVES LEGEND

C=Cognitive P=Psychomotor A=Affective

1 = Knowledge level

2 = Application level

3 = Problem-solving level

COGNITIVE OBJECTIVES

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

- 7-3.1 List the types of abuse found in the pediatric and geriatric population (C-1)
- 7-3.2 Summarize the assessment and management of pediatric and elder abuse patients (C-3)
- 7-3.3 Explain the legal ramifications of failing to report abuse. (C-1)
- 7-3.4 Describe the documentation needed for abuse patients (C-1)
- 7-3.5 Identify the potential assistance that can be provided for homeless patients. (C-2)
- 7-3.6 Give examples of health issues for which the bariatric patient is at increased risk. (C-1)
- 7-3.7 Recognize the increased planning necessary to move bariatric patients. (C-1)
- 7-3.8 Identify technology assisted/dependent equipment used by patients. (C-1)
- 7-3.9 Summarize the concept of hospice and the EMS role with patients under hospice care. (C-3)
- 7-3.10 Explain what a tracheostomy is and the routine and acute care which may be necessary. (C-1)
- 7-3.11 Relate to patients with sensory deficits and utilize enhanced communication skills. (C-1)
- 7-3.12 Describe the interaction with patients being provided health care at home. (C-1)
- 7-3.13 Prepare to interact with the developmentally disabled patient. (C-2)

AFFECTIVE OBJECTIVES

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

- 7-3.14 Explain the rationale for having skills and knowledge appropriate for dealing with patients that have special challenges. (A-3)
- 7-3.15 Recognize the importance of including family members and other healthcare providers in the assessment and management of patients with special challenges. (A-1)
- 7-3.16 Attend to the feelings of the family when dealing with patients who have special challenges. (A-1)
- 7-3.17 Understand the provider's own response (emotional) to caring for patients with special challenges (A-1)

PSYCHOMOTOR OBJECTIVES

- 7-3.18 Demonstrate the assessment of a patient who has sensory or cognitive deficits (P-1)

PRESENTATION

The EMT will encounter many patients who provide special challenges as care is provided. Understanding some of these patients and their challenges will provide for a quality continuum of care

Declarative (What)

- I. Abuse and Neglect
 - A. Child Abuse
 1. Abuse comes in many forms
 - a. Neglect
 - b. Physical abuse
 - c. Sexual abuse
 - d. Emotional abuse
 2. Assessment
 - a. History of incident may not align with injury
 - b. Scene appearance may create a concern for abuse or neglect, i.e filthy environment, no food in refrigerator
 - c. Caregiver's behavior
 - d. Physical findings not consistent with common childhood injuries, bruises in various stages of healing
 3. Management
 - a. Provide care for child
 - b. Reporting is mandatory for EMS provider; must report to social services-information provided to ER does not fulfill statutory obligation
 - c. Safe transport may be provided with use of child seats
 - d. Role of child/adult protective services-will investigate
 4. Legal aspects- failure to report can result in legal ramifications for the EMS provider
 5. Documentation-objective statement of facts; don't allow emotions to affect accuracy of patient care report.
 - B. Elder Abuse
 1. Types of abuse
 - a. Neglect
 - b. Physical abuse
 - c. Sexual abuse
 - d. Emotional abuse
 - e. Financial abuse
 2. Epidemiology-difficult to determine prevalence due to under-reporting .

3. Assessment
 - a. Ask questions, listen carefully to answers
 - b. Soft tissue injuries may be present
 - c. Look for evidence of uncared for health issues (i.e., bed sores)
 - d. Observe surroundings-filth, lack of food or heat
 - e. May be difficult to obtain answers due to dementia
 4. Management
 - a. Provide care for patient
 - b. Reporting is mandatory for EMS provider; must report to social services-information provided to ER does not fulfill statutory obligation
 - c. Transport to healthcare facility
 5. Legal aspects-failure to report can result in legal ramifications for EMS Provider
 6. Documentation-objective, clear, concise; use direct quotes from patient.
- II. Homelessness/Poverty
- A. Advocate for patient rights and appropriate care
 - B. Identify facilities that will treat regardless of payment
 - C. Lack of healthcare and prevention will likely increase the probability of disease
 - D. EMS providers should be familiar with assistance resources offered in community
 - E. Treat patient with respect
- III. Bariatric Patients
- A. Increased risk for health issues
 1. Diabetes
 2. Hypertension
 3. Heart disease
 4. Stroke
 - B. Patient handling Issues
 1. Utilize adequate resources to prevent back injuries in EMT
 2. Position patient to assist in respiratory efforts
 3. Treat patient with dignity and respect as with other patients
- IV. Patients who are technology assisted/dependent
- A. Ventilation device
 1. Patient cannot breathe without assistance
 2. If ventilator malfunctions, remove machine; ventilate through tracheostomy tube
 - B. Apnea monitoring/pulse oximetry
 - C. Long-term vascular access devices
 1. May have infections, clotted lines
 2. Control any bleeding with direct pressure
 - D. Dialysis shunts/shunts for neurologic conditions
 1. May become infected or blocked

- 2. May affect intracranial pressure
 - E. Nutritional support (i.e. gastric tubes)
 - 1. Can become dislodged
 - 2. Assess for signs of abdominal bleeds
 - F. Colostomy or ileostomy
 - 1. Prone to infection
 - 2. Follow local protocol for care
- V. Hospice care and terminally ill
 - A. Hospice
 - 1. Palliative (comfort) care versus curative care
 - 2. Terminally ill as verified by physician
 - 3. Typically cancer, heart failure, Alzheimer's disease, AIDS
 - B. EMS Intervention
 - 1. Provide palliative care as possible
 - 2. Compassion, understanding, sensitivity necessary
 - C. DNR (Do Not Resuscitate) Orders
 - 1. DNR bracelet
 - 2. May be necessary to contact medical control
 - 3. Follow local protocol for handling of death
- 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. Suction as needed
 - D. Acute Care
 - 1. May become blocked or dislodged
 - 2. Maintain airway
- VII. Sensory Deficits
 - A. Sight
 - 1. Canes, eyeglasses may be present
 - 2. Guide dogs are allowed to go with patient
 - 3. Allow patient to take your arm, if ambulatory
 - 4. Verbalize actions, treatment, environmental information
 - B. Hearing Impaired
 - 1. Hearing aid issues
 - 2. Communication
 - a. Face patient (so patient can lip read)
 - b. Lighted area
 - c. Communicate by writing
 - d. Obtain sign language interpreter
- VIII. Homecare
 - A. Common for patients over age 65

- B. Various reasons for calls-injury, illness
- C. Home healthcare provider may be able to provide information regarding patient's change from baseline condition
- IX. Patient with developmental disability
 - A. Respect as with any other patient
 - B. Family or friends may supply additional Information
 - C. Take special care to provide explanations
 - D. Watch for signs of anxiety and agitation, attempt to calm patient.

MODULE 7

Special Patient Populations

Lesson 7-4

Evaluation: Special Patient Populations

OBJECTIVES

OBJECTIVES LEGEND

C=Cognitive P=Psychomotor A=Affective

1 = Knowledge level

2 = Application level

3 = Problem-solving level

COGNITIVE OBJECTIVES

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

Demonstrate knowledge of the cognitive objectives of Lesson 7-1: Special Patient Populations-Pediatric.

Demonstrate knowledge of the cognitive objectives of Lesson 7-2: Special Patient populations –Geriatric

Demonstrate knowledge of the cognitive objectives of Lesson 7-3: Special Patient Populations-Patients with Special Challenges

AFFECTIVE OBJECTIVES

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

Demonstrate knowledge of the affective objectives of Lesson 7-1: Pediatric

Demonstrate knowledge of the affective objectives of Lesson 7-2: Geriatric

Demonstrate knowledge of the affective objectives of Lesson 7-3: Patients with Special Challenges

PSYCHOMOTOR OBJECTIVES

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

Demonstrate knowledge of the psychomotor objectives of Lesson 7-1: Pediatric

Demonstrate knowledge of the psychomotor objectives of Lesson 7-2: Geriatric

Demonstrate knowledge of the cognitive objectives of Lesson 7-3: Patients with Special Challenges

MODULE 8

EMS Operations

Lesson 8-1

Ambulance Operations

OBJECTIVES

OBJECTIVES LEGEND

C=Cognitive P=Psychomotor A=Affective

1 = Knowledge level

2 = Application level

3 = Problem-solving level

COGNITIVE OBJECTIVES

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

- 8-1.1 Discuss the medical and non-medical equipment needed to respond to a call. (C-1)
- 8-1.2 List the phases of an ambulance call. (C-1)
- 8-1.3 Describe the general provisions of state laws relating to the operation of the ambulance and privileges in any or all of the following categories: (C-1)
 - Speed
 - Warning lights
 - Sirens
 - Right-of-way
 - Parking
 - Turning
- 8-1.4 Describe why defensive driving is critical to safe ambulance vehicle operation. (C-1)
- 8-1.5 Describe the importance of being familiar with your EMS response area (C-1)
- 8-1.6 Describe the importance of anticipating special conditions that may complicate or create hazardous driving conditions. (C-2)
- 8-1.7 List contributing factors to unsafe driving conditions. (C-1)
- 8-1.8 Describe how an unsafe scene will vary ambulance response (C-1)
- 8-1.9 Describe the importance of "staging" when responding to unsafe or unstable scenes. (C-2)
- 8-1.10 Describe the considerations that should be given to:
 - Request for escorts
 - Following an escort vehicle
 - Intersections (C-1)
- 8-1.11 Discuss "Due Regard for Safety of All Others" while operating an emergency vehicle. (C-1)
- 8-1.12 Explain the use of the Incident Command System in ambulance operations. (C-1)
- 8-1.13 State what information is essential in order to respond to a call. (C-1)
- 8-1.14 Discuss various situations that may affect response to a call. (C-1)
- 8-1.15 Differentiate between the various methods of moving a patient to the unit based upon injury or illness. (C-3)

- 8-1.16 Apply the components of the essential patient information in a written report. (C-2)
- 8-1.17 Summarize the importance of preparing the unit for the next response. (C-1)
- 8-1.18 Identify what is essential for completion of a call. (C-1)
- 8-1.19 Distinguish among the terms cleaning, disinfection, high-level disinfection, and sterilization. (C-3)
- 8-1.20 Describe how to clean or disinfect items following patient care. (C-1)

AFFECTIVE OBJECTIVES

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

- 8-1.21 Explain how safe driving skills can affect other crew members and the patient during transport. (A-1)
- 8-1.22 Explain how anticipating driving hazards can contribute greatly to the safe operation of emergency vehicles. (A-1)
- 8-1.23 Explain the rationale for appropriate report of patient information. (A-3)
- 8-1.24 Explain the rationale for having the unit prepared to respond. (A-3)

PSYCHOMOTOR OBJECTIVES

No psychomotor objectives identified.

PRESENTATION

Declarative (What)

- I. Phases of an ambulance call
 - A. Preparation for the call
 - 1. Equipment
 - a. Medical
 - (1) Basic supplies
 - (2) Patient transfer equipment
 - (3) Airways
 - (4) Suction equipment
 - (5) Artificial ventilation devices
 - (6) Oxygen inhalation equipment
 - (7) Cardiac compression equipment
 - (8) Basic wound care supplies
 - (9) Splinting supplies
 - (10) Childbirth supplies
 - (11) Medications
 - (12) Automated external defibrillator
 - b. Non-medical
 - (1) Personal safety equipment per local, state, and federal standards
 - (2) Pre-planned routes or comprehensive street maps
 - 2. Personnel
 - a. Available for response

- b. At least one EMT-Basic in patient compartment is minimum staffing for an ambulance - two is preferred.
- 3. Daily inspections
 - a. Inspection of vehicle systems
 - (1) Fuel
 - (2) Oil
 - (3) Engine cooling system
 - (4) Battery
 - (5) Brakes
 - (6) Wheels and tires
 - (7) Headlights
 - (8) Stoplights
 - (9) Turn signals
 - (10) Emergency warning lights
 - (11) Wipers
 - (12) Horn
 - (13) Siren
 - (14) Doors closing and latching
 - (15) Communication system
 - (16) Air conditioning/heating system
 - (17) Ventilation system
 - b. Equipment
 - (1) Checked and maintained
 - (2) Restocked and repaired
 - (3) Batteries for defibrillator, suction, oxygen, etc.
- 4. Utilization of safety precautions and seat belts.
- B. Dispatch
 - 1. Central access
 - 2. 24-hour availability
 - 3. Trained personnel
 - 4. Dispatch information
 - a. Nature of call
 - b. Name, location, and callback number of caller
 - c. Location of patient
 - d. Number of patients and severity
 - e. Other special problems
 - 5. Importance of being familiar with your EMS response area
 - a. Road maps
 - b. Computer mapping
 - c. GPS systems
 - d. Known hazards
 - e. Road construction
- C. En route
 - 1. Seat belts
 - 2. Notify dispatch - refer to Communications module
 - 3. Essential information

- a. Nature of the call
- b. Location of the call
4. Driving the ambulance
 - a. Emergency vehicle operations
 - (1) It is recommended, and in some states mandated, that the driver of an emergency vehicle attend an approved driving course
 - (2) Characteristics of good ambulance operators
 - (a) Physically fit
 - (b) Mentally fit
 - (c) Able to perform under stress
 - (d) Positive attitude about abilities
 - (e) Tolerant of other drivers
 - (f) Ability to anticipate and compensate for environmental and operational hazards that could imperil safe operation of the ambulance vehicle
 - (3) Safe driving is an important phase in the emergency medical care of the ill or injured patient
 - (a) The driver and all passengers should wear safety belts
 - (b) Become familiar with the characteristics of your vehicle
 - (c) Be alert to changes in weather and road conditions
 - (d) Exercise caution in use of red lights and siren
 - (e) Select appropriate route
 - (f) Maintain safe following distance
 - (g) Drive with due regard for safety of all others
 - (h) Know appropriateness of using lights and sirens
 - (i) Headlights are the most visible warning device on an emergency vehicle
 - b. Obtain additional information from dispatch.
 - c. Assign personnel to specific duties.
 - d. Assess specific equipment needs.
 - e. Positioning the unit
 - (1) For safety
 - (a) Uphill from leaking hazards
 - (b) 100 feet from wreckage
 - (i) In front of the wreckage or,
 - (ii) Beyond the wreckage
 - (c) Set parking brake
 - (d) Utilize warning lights
 - (e) Shut off headlights unless there is a need to illuminate the scene

- (2) Staging
 - (a) Unsafe scenes
 - (b) Unstable scenes
 - (c) Multiple casualty scenes
 - (d) Entry into the Incident Command System
 - (i) provides formal structure assures
 - (ii) appropriate resources are present
- (3) To exit the scene. Avoid parking in a location that will hamper exit from the scene.
- f. Laws, regulations and ordinances - review state and local laws, regulations or ordinances in the area relative to the operations of an emergency vehicle, including as needed:
 - (1) Vehicle parking or standing
 - (2) Procedures at red lights, stop signs and intersections
 - (3) Regulations regarding speed limits
 - (4) Direction of flow or specified turns
 - (5) Emergency or disaster routes
 - (6) Use of audible warning devices
 - (7) Use of visual warning devices
 - (8) School buses
- g. Escorts and multiple vehicle response
 - (1) Extremely dangerous
 - (2) Used only if unfamiliar with location of patient or receiving facility
 - (a) No vehicle should use lights or siren
 - (b) Provide a safe following distance
 - (c) Recognize hazards of multiple vehicle response
- h. Intersection crashes - most common type
 - (1) Motorist arriving at intersection as light changes and does not stop
 - (2) Multiple emergency vehicles following closely and waiting motorist does not expect more than one
 - (3) Vision is obstructed by vehicles
- D. Arrival at scene
 - 1. Notify dispatch
 - 2. Size-up
 - a. Body substance isolation
 - (1) Should be a consideration prior to patient contact
 - (2) Use gloves, gowns and eyewear when appropriate
 - b. Scene safety - assess the scene for hazards
 - (1) Is the emergency vehicle parked in a safe location?
 - (2) Is it safe to approach the patient?
 - (3) Does the victim require immediate movement because of hazards?
 - c. Mechanism of injury/nature of illness

- (1) Medical
 - (a) Mass casualty incident
 - (i) Number of patients
 - (ii) Obtain additional help
 - (iii) Begin triage
 - (b) Spine stabilization if necessary
- (2) Trauma
 - (a) Mass casualty incident
 - (i) Number of patients
 - (ii) Obtain additional help
 - (iii) Begin triage
 - (3) Spine stabilization if necessary
- d. Total number of patients
- e. Need for additional help or assistance
- f. Initiating the Incident Command System as appropriate
3. Actions at scene
 - a. Organized
 - b. Rapid/efficient
 - c. Goal of transport in mind
- E. Transferring the patient to the ambulance
 1. Preparing the patient for transport
 - a. Completion of critical interventions
 - b. Check dressings and splints
 - c. Patient covered and secured to moving device
 2. Lifting and moving is accomplished using the guidelines of the lifting/moving module (Module 1, Lesson 1-5)
 3. Concerns for proper decontamination of patients, providers and vehicles
- F. Selecting the appropriate receiving facility
 1. Trauma Centers
 2. Specialty care centers
 3. Immediate stabilization of the patient
 4. Use of Advanced Life Support intercepts & Aeromedical assistance
- G. En route to the receiving facility
 1. Notify dispatch
 2. On-going assessment should be continued
 3. Additional vital sign measurements should be obtained
 4. Notify receiving facility
 5. Reassure patient
 6. Complete prehospital care reports
- H. At receiving facility
 1. Notify dispatch
 2. Transferring the patient at the facility
 - a. Reports
 - (1) Complete verbal report is given at bedside

- (2) Complete written report is completed and left prior to returning to service
- b. Lifting and moving is accomplished using the guidelines of the lifting/moving module (Module 1)
- I. En route to station
 - 1. At station or receiving facility, notify dispatch
 - 2. Prepare for the next call
 - a. Clean and disinfect the ambulance as needed
 - b. Clean and disinfect ambulance equipment
 - c. Restock the disposable supplies
- J. Post run
 - 1. Refuel unit
 - 2. File reports
 - 3. Complete cleaning and disinfection procedures
 - 4. Notify dispatch
- K. Advanced Life Support Intercept considerations
 - 1. Utilization
 - a. Local protocols
 - b. Priority dispatch
 - 2. Choosing intercept sites
 - 3. Communications between vehicles

MODULE 8

EMS Operations

Lesson 8-2

Air Medical and Advanced Life Support Intercept

OBJECTIVES

OBJECTIVES LEGEND

C=Cognitive P=Psychomotor A=Affective

1 = Knowledge level

2 = Application level

3 = Problem-solving level

COGNITIVE OBJECTIVES

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

- 8-2.1 Determine the criteria needed to request ALS intercept. (C-1)
- 8-2.2 Determine the criteria needed to request air medical transport (C-1)
- 8-2.3 Establish a landing zone for medical aircraft. (C-1)
- 8-2.4 Ensure safety of landing zone and all personnel. (C-2)

AFFECTIVE OBJECTIVES

- 8-2.5 Describe the rationale for requesting air or ground ALS. (A-1)

PSYCHOMOTOR OBJECTIVES

- 8-2.6 Demonstrate proper procedure when establishing a landing zone. (P-1,2)

PRESENTATION

Declarative (What)

- I. Introduction
 - A. Definition of Terms
 - 1. ALS – Advanced Life Support
 - 2. Rotary wing aircraft – helicopter
 - 3. Fixed wing aircraft – airplane or jet
 - 4. Landing Zone (LZ) – area secured by emergency responders to safely a helicopter
 - 5. Rotor wash – turbulence created by the movement of the propellers of a helicopter
 - B. Criteria for requesting ALS intercept
 - 1. Severe trauma
 - a. Significant mechanism of injury
 - b. Motor vehicle crashes
 - c. Significant amputations
 - d. Delayed extrication
 - e. Local protocols
 - 2. Medical
 - a. Significant compromise of airway, breathing or circulation

- b. Hypoglycemic emergency
 - c. Severe pain
 - d. Complications associated with a pregnancy
 - e. Local protocols
 - C. Criteria for requesting air medical transport
 - 1. Severe trauma
 - a. Significant mechanism of injury
 - b. Motor vehicle crashes
 - c. Significant amputations
 - d. Delayed extrication
 - e. Need of transport to definitive care with significant distances
 - f. Local protocols
 - 2. Medical
 - a. Acute cardiac compromise
 - b. Significant medical conditions (usually inter-facility)
 - c. Follow local protocols for air transport from scene for medical conditions
- II. Establishing the Landing Zone (LZ)
 - A. Location
 - 1. GPS - if equipped to do so, obtain a reading and relay to dispatch or aircraft
 - 2. Solid and flat
 - 3. Minimum 100' x 100'
 - 4. Hazards or obstructions
 - 5. Potential debris from rotor wash
 - 6. Potential hazards created by rotor wash
 - 7. Special considerations for night time response
 - a. Do not shine any lights on the aircraft as it may cause visual impairment to the pilot
 - b. Obey the requests of the aircraft pilot
 - c. Illuminated LZ vs non-illuminated
 - 8. LZ officer should relay any and all concerns to pilot upon approach but prior to landing
 - 9. Secure landing zone – preferred one individual in each of the four corners to ensure safety
 - 10. Become familiar with local protocols and procedures
 - B. Approach to the aircraft
 - 1. Safety is the number one priority
 - 2. Do not approach aircraft until instructed to do so – this may be several minutes after landing
 - 3. Approach from the front or forward sides of the aircraft in plain view of the pilot or aircraft crew member
 - 4. Secure any loose clothing or head wear
 - 5. Approach in a crouching position
 - 6. Wind gusts can change the pitch of the top rotor as much as four feet; always be alert

7. If approaching on uneven terrain, approach from the down slope side
 8. NEVER approach from the tail rotor side
 9. Assign personnel as “tail rotor guard” especially if aircraft is running while patient is being loaded
 10. Never smoke around the aircraft
 11. Become familiar with local protocols and procedures
- C. Departure of aircraft
1. Follow departure instructions of the crew
 2. Depart area around aircraft the same way you approach – in clear view of the pilot or crew member
 3. Ensure that none of the environmental conditions have changed – be alert to obstructions or hazards that may have moved into the LZ while the aircraft was landed
 4. All ground personnel return to the perimeter of the LZ
 5. Be aware of your surroundings and anticipate unexpected on-lookers that may try to enter the LZ for a closer look
 6. Become familiar with local protocols and procedures

MODULE 8

EMS Operations

Lesson 8-3

Gaining Access

OBJECTIVES

OBJECTIVES LEGEND

C=Cognitive P=Psychomotor A=Affective

1 = Knowledge level

2 = Application level

3 = Problem-solving level

COGNITIVE OBJECTIVES

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

- 8-3.1 Describe the purpose of extrication. (C-1)
- 8-3.2 Discuss the role of the EMT-Basic in extrication. (C-1)
- 8-3.3 Identify what equipment for personal safety is required for the EMT-Basic. (C-1)
- 8-3.4 Define the fundamental components of extrication. (C-1)
- 8-3.5 State the steps that should be taken to protect the patient during extrication. (C-1)
- 8-3.6 Evaluate various methods of gaining access to the patient. (C-3)
- 8-3.7 Distinguish between simple and complex access. (C-3)
- 8-3.8 Identify simple tools required on all ambulances (C-1)
- 8-3.9 Identify uses of the simple hand tools required (C-1)

AFFECTIVE OBJECTIVES

- 8-3.8 Explain the rationale used in determining when it is appropriate for the EMT-Basic to provide extrication and when extrication should be entrusted to specialized personnel trained in advanced rescue techniques. (A-1)

PSYCHOMOTOR OBJECTIVES

No psychomotor objectives identified.

PRESENTATION

Declarative (What)

- I. Fundamentals of Extrication
 - A. Role of the EMT-Basic
 - 1. Non-rescue EMS
 - a. Administer necessary care to the patient before extrication and assure that the patient is removed in a way to minimize further injury.
 - b. Patient care precedes extrication unless delayed movement would endanger life of the patient or rescuer.
 - c. Working with others

- (1) The non-rescue EMS provider will need to work together with the providers of rescue.
 - (2) The non-rescue EMT-Basic should cooperate with the activities of the rescuers, and not allow their activities to interfere with patient care.
2. Rescue EMS
 - a. In some instances, the EMS providers are also the rescue providers.
 - b. A chain of command should be established to assure patient care priorities.
 - (1) Administer necessary care to the patient before extrication and assure that the patient is removed in a way to minimize further injury.
 - (2) Patient care precedes extrication unless delayed movement would endanger life of the patient or rescuer.
- II. Equipment
- A. Personal safety
 1. The number one priority for all EMS personnel.
 2. Protective clothing that is appropriate for the situation should be utilized.
 - B. Patient safety - following the safety of the EMS responders, the next priority is the safety of the patient.
 1. The patient should be informed of the unique aspects of extrication.
 2. The patient should be protected from broken glass, sharp metal and other hazards, including the environment.
- III. Getting to the Patient
- A. Simple access - does not require equipment.
 1. Try opening each door.
 2. Roll down windows.
 3. Have patient unlock doors.
 - B. Complex Access with hand tools-Trans 309 requires specific tools be found on every approved ambulance in Wisconsin and may be used with proper protective gear to gain initial access to a patient that cannot be accessed by means of simple access
 1. 2 portable battery operated lights - used for illumination purposes
 2. 3 reflective road triangles or red light sticks – used as warning devices to attempt to slow traffic or in the event the ambulance has a mechanical breakdown to alert oncoming traffic to the potential hazard
 3. One 12” adjustable wrench - can loosen fasteners or displace light weight sheet metal in gaining initial access to the patient
 4. One slotted (flathead) screwdriver – can unfasten items that may be impeding access to or removal of the patient or used in conjunction with a hammer to cut light weight sheet metal to gain access or assist in removal of a patient

5. One #2 Phillips head screwdriver – can unfasten items that have a Phillips head to gain initial access or removal of the patient
 6. One 12” hack saw and spare blades – can cut light weight sheet metal or plastic to gain initial access or removal of a patient
 7. One 10” locking pliers – multiple uses - can remove fasteners, bend sheet metal, or displace metal that is obstruction initial access to or removal of a patient
 8. One 16 oz. hammer – can bend metal, assist in combination with other hand tools to cut metal to obtain initial access to or removal of a patient
 9. One 24” wrecking bar – can pry back metal or other obstacles that may hinder initial access to or removal of the patient or to attempt to open damaged doors.
 10. Impact resistant eye protection – can protect eyes from flying debris and foreign objects during the extrication or when attempting to gain initial access to the patient
 11. One pair leather gloves - used for initial personal protection from sharp objects routinely found at crash scenes.
 12. One roll 2” Duct Tape – used for multiple purposes primarily for taping over side and rear glass to contain the glass fragments when access to the patient needs to be made by means of breaking glass. Can also be used to cover sharp or exposed edges for patient and personal protection.
 13. Spring loaded center punch – used in conjunction with Duct tape to shatter side or back glass
- C. Complex access - requires use of special tools, special equipment. These are separate programs that can be taken: Trench, High Angle, Basic Vehicle Rescue
- IV. Removing the Patient
- A. Maintain cervical spine stabilization.
 - B. Complete initial assessment.
 - C. Provide critical interventions.
 - D. Immobilize spine securely.
 1. Short spine board
 2. Rapid extrication considerations
 - E. Move the patient, not the immobilization device.
 - F. Use sufficient personnel.
 - G. Choose path of least resistance.
 - H. Continue to protect patient from hazards.

MODULE 8

EMS Operations

Lesson 8-4

Hazardous Materials

OBJECTIVES

OBJECTIVES LEGEND

C=Cognitive P=Psychomotor A=Affective

1 = Knowledge level

2 = Application level

3 = Problem-solving level

COGNITIVE OBJECTIVES

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

- 8-4.1 Explain the EMT-Basic's role during a call involving hazardous materials. (C-1)
- 8-4.2 Describe what the EMT-Basic should do if there is reason to believe that there is a hazard at the scene. (C-1)
- 8-4.3 Describe the actions that an EMT-Basic should take to ensure bystander safety. (C-1)
- 8-4.4 State the role the EMT-Basic should perform until appropriately trained personnel arrive at the scene of a hazardous materials situation. (C-1)
- 8-4.5 Break down the steps to approaching a hazardous situation. (C-1)
- 8-4.6 Discuss the various environmental hazards that affect EMS. (C-1)

AFFECTIVE OBJECTIVES

No affective objectives identified.

PSYCHOMOTOR OBJECTIVES

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

- 8-4.1 Given a scenario of a hazardous materials situation, produce a proper management scenario. (P-2)
- 8-4.2 Demonstrate working knowledge of the Emergency Response Guide Book (P-2)
- 8-4.3 Demonstrate a working knowledge of OSHA 1919.120 (HAZWOPER). (P-2)
- 8-4.4 Demonstrate a working knowledge of NFPA 472. (P-2)

PRESENTATION

Declarative (What)

- I. Hazardous Materials
 - A. Common problem
 - B. Actual extent unknown
 - C. Safety is the primary concern
 - 1. EMT-Basic and crew
 - 2. Patient

3. Public
- D. Approaching the scene
 1. Identification
 - a. Occupancy
 - b. Containers - size/shape
 - c. Placards
 - d. Shipping papers
 - e. Senses
 2. General procedures
 - a. Park upwind/uphill from the incident, safe distance
 - b. Keep unnecessary people away from area
 - c. Isolate the area
 - (1) Keep people out
 - (2) Do not enter unless fully protected with proper equipment and **trained to do so**
 - d. Avoid contact with material
 - e. Remove patients to a safe zone, if no risk to EMT-Basic
 - f. Do not enter a HazMat area unless you are trained as a HazMat Tech and have proper training in SCBA
- E. Environmental hazards
- F. Resources
 1. Local hazardous materials response team
 2. CHEMTREC 800-424-9300
 3. Hazardous Materials, The Emergency Response Handbook, published by the United States Department of Transportation
 - a. **Proper instruction on usage and application of the Emergency Response Guide Book is essential to ensure safe operations at a hazardous materials scene.**
- G. Hazardous Waste Operations and Emergency Response standard (HAZWOPER) (Note: This course is not a requirement of this EMT curriculum. It may, however, be required by local jurisdiction and dependent upon your role in the prehospital setting.)
 1. OSHA 1910.120
 - a. **Requires preplanning of responses to potential threats of hazardous materials cause by natural phenomenon.**
- H. National Fire Protection Association HazMat requirements for EMS providers
 1. NFPA 472 (Note: This course is not a requirement of this EMT curriculum. It may, however, be required by local jurisdiction and dependent upon your role in the prehospital setting.)
 - a. **Outlines and identifies the requirements of responses to incidents involving the dissemination of or discovery of a device that is defined as a Weapon of Mass Destruction (WMD)**

MODULE 8

EMS Operations

Lesson 8-5

Mass Casualty Incident, Command System and National Incident Management System

OBJECTIVES

OBJECTIVES LEGEND

C=Cognitive P=Psychomotor A=Affective

1 = Knowledge level

2 = Application level

3 = Problem-solving level

COGNITIVE OBJECTIVES

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

- 8-5.1 Determine the criteria needed to define a Mass Casualty Incident (MCI). (C-1)
- 8-5.2 Determine the criteria needed to establish an Incident Command System (ICS) (C-1)
- 8-5.3 Understand the rationale behind the National Incident Management System (NIMS) (C-1)

AFFECTIVE OBJECTIVES

No affective objectives identified.

PSYCHOMOTOR OBJECTIVES

- 8-5.4 Demonstrate proper procedure when establishing Incident Command. (P-1,2)

PRESENTATION

Declarative (What)

- I. Introduction
 - A. Definition of Terms
 - 1. MCI – Mass Casualty Incident
 - 2. ICS – Incident Command System
 - 3. NIMS – National Incident Management System
 - a. IS 700
 - b. ICS 100
 - B. Criteria for defining an MCI
 - 1. Any situation that overwhelms the existing resources of a specific community or jurisdiction
 - a. A multiple vehicle crash with multiple victims
 - b. Natural disaster of significant magnitude
 - c. Man-made disaster of significant magnitude
 - d. Terrorist activity or release of a WMD agent
 - C. Criteria for deploying the Incident Command System (ICS)
 - 1. Any event requiring the response of multiple agencies.

2. Recommended for any event within your jurisdiction
3. Per local protocol
- D. Options for NIMS / ICS training (Note: These courses are not requirements of this EMT curriculum. They may, however, be required by local jurisdiction and dependent upon your role in the prehospital setting.)
 1. IS 700
 - a. Introduction to the National Incident Management System (NIMS) required initial course to take other ICS courses. IS 700 is required training. Available on line at: <http://training.fema.gov/EMIWEB/IS/is700.asp>
 2. ICS 100
 - a. More in-depth introduction and training – enhancement of the IS 700 course ICS 100 is required training for all emergency responders ICS 100 training is available on line at: <http://training.fema.gov/emiweb/is/is100b.asp>

Module 8

EMS Operations

Lesson 8-6

Weapons of Mass Destruction

OBJECTIVES

OBJECTIVES LEGEND

C=Cognitive P=Psychomotor A=Affective

1 = Knowledge level

2 = Application level

3 = Problem-solving level

COGNITIVE OBJECTIVES

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

- 8-6.1 Explain the historical perspective of terrorism. (C-1)
- 8-6.2 Identify the legal definition of Weapons of Mass Destruction. (C-1)
- 8-6.3 Describe the rationale used by terrorists as justification for the use of Weapons of Mass Destruction. (C-1)
- 8-6.4 Identify known international and domestic terrorist threats. (C-1)
- 8-6.5 Define current trends in terrorism. (C-1)
- 8-6.6 Identify the categories of Weapons of Mass Destruction. (C-1)
- 8-6.7 Describe the immediate and long-term effects of WMD. (C-1)
- 8-6.8 Describe the concept and purpose of secondary and/or multiple devices. (C-3)
- 8-6.9 Describe the potential outcomes of WMD incidents. (C-1)
- 8-6.10 Describe the need for and methods of obtaining additional resources when dealing with existing or suspected WMD emergencies. (C-1)
- 8-6.11 Describe the Basic protective actions to be taken by responding emergency services personnel. (C-1)
- 8-6.12 List indicators and identifiers that give clues to the existence or suspected existence of WMD emergencies. (C-1)
- 8-6.13 Explain the proper and appropriate use of the Mark I Auto-Injector kit.(C-1)
- 8-6.14 Describe the proper and appropriate use of the Emergency Response Guidebook (ERG) in managing suspected or existing WMD emergencies. (C-1)
- 8-6.15 Describe the proper and appropriate use of the ERG in identifying appropriate protective actions and pre-hospital care of patients. (C-1)

AFFECTIVE OBJECTIVES

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

- 8-6.16 Define the motivation behind the use of WMD to achieve political, social and/or religious goals. (A-1)
- 8.6.17 Establish the importance of recognizing common characteristics of terrorist groups. (A-1)
- 8.6.18 Recognize the critical role specialized training play in properly preparing for, dealing with and recovering from WMD emergencies. (A-1)

PSYCHOMOTOR OBJECTIVES

- 8-6.19 At the completion of this lesson, the EMT-Basic student will be able to:
- 8-6.20 Given a scenario of a WMD incident, demonstrate the use of the ERG to establish appropriate isolation zones. (P-2)
- 8-6.21 Given a scenario of WMD incident, demonstrate the use of the ERG in identifying what additional physical and informational resources are appropriate to the emergency. (P-2)
- 8-6.22 Demonstrate the proper use of a Mark I kit in the delivery of Atropine & 2Pam Chloride for use incidents involving organophosphate or nerve agents. (P-1)

PRESENTATIONDeclarative (What)

- I. Terrorism Defined
 - A. USC Title 22, Section 2656f(d) definition
 - B. Federal Bureau of Investigation definition
 - C. WMD Legal definition; Title 18 U.S. Code
 - D. Terrorist Threats
 1. May be international or domestic
 - a. Ideology or value driven
 - b. Mitigated by intentions, capabilities and motive
 2. Historical Reasons
 - a. Religious
 - b. Social/Economic upheaval
 - c. Nationalism, anarchism, Marxism
 - d. Ethnic/Racial ideologies
 - e. Regional or global interests
 3. Use of WMD
 - a. Cost
 - b. Availability
 - c. Effectiveness
 - d. Detection
 - e. Leverage
 4. Terrorist acts & threats
 - a. International & Domestic
 - b. Ideology or Value driven
 - (1) Events
 - (2) Targets
 - c. Histories, intentions, capabilities & motivators
 5. International Terrorist Threats
 - a. Events that occurred
 - (1) World trade center bombing 1993
 - (2) Helicopter in Somalia 1993
 - (3) USS Cole Bombing 2000

- (4) World Trade Center 2001
 - b. Events that were planned and did not occur
 - (1) Assassination attempt of Pres Clinton in Philippines 1995
 - (2) Mid-air bombing of US trans-pacific flights 1995
 - (3) Bombing of LA International Airport 1999
 - (4) Richard Reid – Shoe bomb 2001
 - 6. Domestic Terrorist Threats
 - a. Right-wing
 - (1) Typically anti-government
 - (2) Racial superiority
 - b. Left-wing
 - (1) Typically espouse socialist doctrine
 - (2) Anti-capitalistic
 - c. Extremists
 - (1) Earth liberation front
 - (2) Animal liberation front
 - (3) Etc.
 - d. Hate groups
 - e. Patriotic groups
 - f. Cults
 - g. Single issue groups
 - h. Lone individuals
 - 7. Terrorist Threats
 - a. Weapons of Mass Destruction
 - b. Terrorist use of emerging technology
 - 8. Probability of an attack on US is high
 - a. Incendiary or explosive devices are most probable
 - b. Diversity of targets is high
- II. Weapons of Mass Destruction
 - A. Increase alert posture
 - 1. Events of 9/11/01
 - 2. Possibility of additional attacks
 - 3. Growing interest in WMD
 - a. Operational repercussions
 - b. Fear 7 Psychological implications
 - B. Response to WMD
 - 1. Known versus undetected WMD incidents
 - 2. WMD Response complexities
 - a. Additional threats
 - (1) Secondary devices
 - (2) Cumulative exposure
 - b. Extensive physical damage
 - c. Physical and psychological threats
 - C. Medicine is not an exact science
 - 1. Patient with clean bill of health dies the next day

- D. Law enforcement is not an exact science
 - 1. Many threats are investigated and found to be groundless
 - 2. Acts of terrorism occur the next day
 - a. Dependent upon the weapons used
 - b. May or may not be cumulative
 - c. May or may not be known
- E. Identifying terrorist activity
 - 1. Difficult in a free society
 - a. Rights & civil liberties
 - b. Stereotypes & preconceptions
 - 2. Threat indicators
 - a. Gathering of target intelligence
 - b. Acquisition of weapons, explosives, biologicals, etc
 - c. Attempts to gain access
 - 3. Suspicious activity
 - a. Overwhelming numbers of reports
 - b. Identifying probable targets
- F. WMD Threats
 - 1. Chemical agents
 - 2. Biological agents
 - 3. Radiological materials
 - 4. Explosive & Incendiary devices
- G. Devices
 - 1. Chemical agents
 - a. Categories
 - (1) Blister agents
 - (2) Choking agents
 - (3) Blood agents
 - (4) Nerve agents
 - (5) Toxic chemicals
 - b. Characteristics
 - (1) Incapacitating versus lethal
 - (2) Persistent versus non-persistent
 - 2. Biological Agents
 - a. Categories
 - (1) Bacteria
 - (2) Rickettsia
 - (3) Viruses
 - (4) Toxins
 - b. Routes of entry
 - (1) Respiration
 - (2) Ingestion
 - (3) Transdermal
 - (4) Absorption (rare)
 - 3. Radiological Materials
 - a. Means of exposure

- (1) Nuclear weapons
 - (2) Fissile materials
 - 4. Explosive & Incendiary Devices
 - a. Components
 - (1) Triggering device
 - (2) Body (container)
 - (3) Filler (Explosive or flammable)
 - b. Kinematics
 - (1) Force (kinetic energy) equals Mass/2 times velocity
 - (a) Squared
 - (2) Frangibility (ability to burst into multiple projectiles)
- III. Emergency Response
 - A. Taking Control of the Incident – Awareness Level Training
 - 1. Identifying the need for additional resources
 - a. Scene size-up
 - b. Notification of proper authorities
 - c. Requesting resources
 - 2. Basic protective actions
 - a. Uphill & Up-wind
 - b. Objectives
 - (1) Recognize the material
 - (2) Isolation distances
 - (3) Protect – prevent contamination
 - (4) Notify chain of command
 - B. Medical Intervention – Self Rescue
 - 1. The Mark I auto-injector kit
 - a. Limited usefulness
 - b. For rescuer use only
 - c. Contents
 - (1) Atropine (2 mg)
 - (2) 2PAM Chloride
 - (3) Requires multiple injections
 - (4) Deactivates acetylcholine by blocking receptor sites & breaks enzyme-agent bond
 - d. Administration
 - (1) Site
 - (a) Lateral surface – Mid-thigh
 - (b) Lateral surface – upper buttocks
 - e. Down-wind prediction plotting
 - (1) Guidebook predictions
 - (2) Computer models
 - C. The Emergency Response Guidebook (ERG)
 - 1. Recognizing & Identifying hazards
 - a. Name
 - b. ID Number
 - c. Placards

2. Protective actions
3. Isolation precautions
4. Evacuation
- D. Using the ERG
 1. Find the Chemical
 2. Review the action guide
 3. Establish isolation & protection distances
 4. Establish zones
- E. Computer modeling
 1. CAMEO
 2. ALOHA
 3. MARPLOT
- F. Protective Action Options
 1. Shelter in-place
 - a. Short duration
 - b. Moving increases hazard
 - c. Impractical to move
 2. Evacuate
 - a. Potential of escalating danger
 - (1) Fire
 - (2) Explosion
 - b. Long duration
 - c. Increasing risk of contamination
- G. Emergency Response
 1. First Aid
 - a. Largely symptomatic
 - b. Prevent secondary contamination
 - (1) Rescuers
 - (2) Facilities
 2. Spill/leak mitigation
 - a. Not an awareness level activity
 - b. Usually requires special training & equipment
 3. Fire Fighter
 - a. Definition of hazard
 - b. Defensive versus offensive
 - c. Role of awareness
- H. Debrief the Incident

MODULE 8

EMS Operations

Lesson 8-7

Evaluation: EMS Operations

OBJECTIVES

OBJECTIVES LEGEND

C=Cognitive P=Psychomotor A=Affective

1 = Knowledge level

2 = Application level

3 = Problem-solving level

COGNITIVE OBJECTIVES

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

Demonstrate knowledge of the cognitive objectives of Lesson 8-1: Ambulance Operations.

Demonstrate knowledge of the cognitive objectives of Lesson 8-2: Air Medical and Advanced Life Support Intercept.

Demonstrate knowledge of the cognitive objectives of Lesson 8-3: Gaining Access.

Demonstrate knowledge of the cognitive objectives of Lesson 8-4: Hazardous Materials.

Demonstrate knowledge of the cognitive objectives of Lesson 8-5: Mass Casualty Incidents, Incident Command System and National Incident Management System.

Demonstrate knowledge of the cognitive objectives of Lesson 8-6: Weapons of Mass Destruction.

AFFECTIVE OBJECTIVES

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

Demonstrate knowledge of the affective objectives of Lesson 8-1: Ambulance Operations.

Demonstrate knowledge of the affective objectives of Lesson 8-2: Air Medical and Advanced Life Support Intercept.

Demonstrate knowledge of the affective objectives of Lesson 8-3: Gaining Access.

Demonstrate knowledge of the affective objectives of Lesson 8-4: Hazardous Materials.

Demonstrate knowledge of the affective objectives of Lesson 8-5: Mass Casualty Incidents, Incident Command System and National Incident Management System.

Demonstrate knowledge of the affective objectives of Lesson 8-6: Weapons of Mass Destruction.

PSYCHOMOTOR OBJECTIVES

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

Demonstrate knowledge of the psychomotor objectives of Lesson 8-1: Ambulance Operations.

Demonstrate knowledge of the psychomotor objectives of Lesson 8-2: Air Medical and Advanced Life Support Intercept.

Demonstrate knowledge of the psychomotor objectives of Lesson 8-3: Gaining Access.

Demonstrate knowledge of the psychomotor objectives of Lesson 8-4: Hazardous Materials.

Demonstrate knowledge of the psychomotor objectives of Lesson 8-5: Mass Casualty Incidents, Incident Command System and National Incident Management System.

Demonstrate knowledge of the psychomotor objectives of Lesson 8-6: Weapons of Mass Destruction.