

Alaska ETT to EMT-I Bridge Course

Curriculum

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Introduction

This outline format curriculum is designed to complement the learning objectives presented in the ETT to EMT-I bridge course guide. It is a modified version of the National Standard Curriculum with the following changes:

- Presentation Outlines only.
- Information added for Alaska specific objectives
- Topics covered in the ETT curriculum are in gray

As noted above, the areas shaded gray are considered to have been sufficiently covered in ETT training. It should not normally be necessary to “re-lecture” this material. It is included for use in remediation. Some ETT class teach optional objectives (childbirth, EMS Operations, Oxygen Delivery, Oral and Nasal Airways, Traction Splinting and PASG.) These objectives are considered in this curriculum to be new. Instructors should measure competence with these topics and include what is necessary.

The review items prefaced by “R” in the learning objectives may be covered in less detail than the new material. These items were classified as important and worth review time even though considered core ETT material.

Instructors should find this curriculum useful when designing lesson plans for the bridge class. Instructors are encouraged to modify the contents to best suit the needs of the class. Recognize that this curriculum is but one method to teach the materials required by the learning objectives. Curriculum changes should improve learning by enhancing what is listed here. Deletions should be considered carefully. It may be appropriate when students have mastered the material. If not, curriculum deletions are not recommended.

Students should find this curriculum useful when studying and learning the material for the first time. This is the need to know stuff. Anything else in the textbook or handouts is enhancement material. Use this and the learning objectives to find out what you know and what more you need to learn.

Members of the State EMS training Committee in 1999 developed the Alaska specific components of this curriculum.

Comments:

Instructors are encouraged to comment on this curriculum. Comments should be directed to your EMS Training Committee Representative or the Section of Community Health and EMS.

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Preparatory

Lesson 1-1

Introduction to Emergency Care

Declarative (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-Basic
 - 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. Levels of training
 - a. ETT
 - b. EMT-Basic
 - c. EMT-Intermediate
 - d. EMT-Paramedic
 - 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
 - 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
 - 7. Overview of the local EMS system
 - a. Health Aides
 - b. Midlevel Practitioners
 - B. Roles and Responsibilities of the EMT-Basic
 - 1. Personal safety
 - 2. Safety of crew, patient and bystanders
 - 3. Patient assessment
 - 4. Patient care based on assessment findings
 - 5. Lifting and moving patients safely
 - 6. Transport/transfer of care
 - 7. Record keeping/data collection
 - 8. Patient advocacy (patient rights) - patient as a whole
 - 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. Puts patient's needs as a priority without endangering self.
 - 4. Maintains current knowledge of local, state, and national issues affecting EMS.
 - 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-Basic 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-Basic 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

Preparatory

Lesson 1-2

Well-Being of the EMT-Basic

Declarative (What)

I. Emotional Aspects of Emergency Care

A. Death and dying

1. Stages

- a. Denial ("Not me.") - defense mechanism creating a buffer between shock of dying and dealing with the illness/injury.
- b. Anger ("Why me.")
 - (1) EMT-Basics may be the target of the anger.
 - (2) Don't take anger or insults personally.
 - (a) Be tolerant.
 - (b) Do not become defensive.
 - (3) Employ good listening and communication skills.
 - (4) Be empathetic.
- c. Bargaining ("OK, but first let me...") - agreement that, in the patient's mind, will postpone the death for a short time.
- d. Depression ("OK, but I haven't...")
 - (1) Characterized by sadness and despair.
 - (2) Patient is usually silent and retreats into his own world.
- e. Acceptance ("OK, I am not afraid.")
 - (1) Does not mean the patient will be happy about dying.
 - (2) The family will usually require more support during this stage than the patient.

2. Dealing with the dying patient and family members

- a. Patient needs include dignity, respect, sharing, communication, privacy and control.
- b. Family members may express rage, anger and despair.
- c. Listen empathetically.
- d. Do not falsely reassure.
- e. Use a gentle tone of voice.
- f. Let the patient know everything that can be done to help will be done.
- g. Use a reassuring touch, if appropriate.
- h. Comfort the family.

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-Basic will experience personal stress as well as encounter patients and bystanders in severe stress.

C. Stress management

1. Recognize warning signs

- a. Irritability to co-workers, family, friends
- b. Inability to concentrate
- c. Difficulty sleeping/nightmares
- d. Anxiety
- e. Indecisiveness
- f. Guilt
- g. Loss of appetite
- h. Loss of interest in sexual activities

- i. Isolation
 - j. Loss of interest in work
 - 2. Life-style changes
 - a. Helpful for "job burnout"
 - b. Change diet
 - (1) Reduce sugar, caffeine and alcohol intake
 - (2) Avoid fatty foods
 - (3) Increase carbohydrates
 - c. Exercise
 - d. Practice relaxation techniques, meditation, visual imagery
 - 3. Balance work, recreation, family, health, etc.
 - 4. EMS personnel and their family's and friends' responses
 - a. Lack of understanding
 - b. Fear of separation and being ignored
 - c. On-call situations cause stress
 - d. Can't plan activities
 - e. Frustration caused by wanting to share
 - 5. Work environment changes
 - a. Request work shifts allowing for more time to relax with family and friends.
 - b. Request a rotation of duty assignment to a less busy area.
 - 6. Seek/refer professional help.
 - D. Critical incident stress debriefing (CISD)
 - 1. A team of peer counsellors 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. CISD 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 CISD 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. Defusings
 - 6. CISD
 - 7. Follow up services
 - 8. Spouse/family support
 - 9. Community outreach programs
 - 10. Other health and welfare programs such as wellness programs
- II. Scene Safety
 - A. Body substance isolation (BSI) (Bio-Hazard)
 - 1. EMT-Basic's and patient's safety
 - a. Hand washing
 - b. Eye protection

- (1) If prescription eyeglasses are worn, then removable side shields can be applied to them.
 - (2) Goggles are NOT required.
 - c. Gloves (vinyl or latex)
 - (1) Needed for contact with blood or bloody body fluids.
 - (2) Should be changed between contact with different patients.
 - d. Gloves (utility) - needed for cleaning vehicles and equipment
 - e. Gowns
 - (1) Needed for large splash situations such as with field delivery and major trauma.
 - (2) Change of uniform is preferred.
 - f. Masks
 - (1) Surgical type for possible blood splatter (worn by care provider)
 - (2) High Efficiency Particulate Air (HEPA) respirator if patient suspected for or diagnosed with tuberculosis (worn by care provider)
 - (3) 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
- 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 Haz-Mat teams.
 - d. EMT-Basics 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-Basic 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, Module 1, Lesson 1-3).
 - (1) Do not disturb the scene unless required for medical care.
 - (2) Maintain chain of evidence.

III. Safety Precautions in Advance - Suggested Immunizations

- A. Tetanus prophylaxis
- B. Hepatitis B vaccine
- C. Verification of immune status with respect to commonly transmitted contagious diseases
- D. Access or availability of immunizations in the community
- E. Tuberculin purified protein derivative (PPD) testing
- F. Others

Lesson 1-3

Medical/Legal and Ethical Issues

Declarative (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-Basic may be contingent upon medical direction.
 - a. Telephone/radio communications
 - b. Approved standing orders/protocols
 - c. Responsibility to medical direction
 - B. Ethical responsibilities
 - 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
- 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-Basic should begin resuscitation efforts.
- 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.
- IV. Assault/Battery
 - A. Unlawfully touching a patient without his consent

- B. Providing emergency care when the patient does not consent to the treatment
- V. 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. When in doubt, err in favor of providing care.
 - F. Documentation is a key factor to protect EMT-Basic in refusal.
 - 1. Competent adult patients have the right to refuse treatment.
 - 2. Before the EMT-Basic 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-Basic should never make an independent decision not to transport.
- VI. Abandonment - termination of care of the patient without assuring the continuation of care at the same level or higher.
- VII. Negligence - deviation from the accepted standard of care resulting in further injury to the patient. Components:
 - A. Duty to act
 - B. Breach of the duty
 - C. Injury/damages were inflicted
 - 1. Physical
 - 2. Psychological
 - D. The actions of the EMT-Basic caused the injury/damage.
- VIII. 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.
 - B. Legal duty to act may not exist. May be moral/ethical considerations.
 - 1. In some states, while off duty, if the EMT-Basic comes upon an accident while driving.
 - 2. When driving the ambulance not in the company's service area and EMT-Basic observes an accident.
 - a. Moral/ethical duty to act

- b. Risk management
 - c. Documentation
 - 3. Specific state regulations regarding duty to act.
- IX. 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
- X. 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-Basic'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
- XI. Potential Crime Scene/Evidence Preservation
 - A. Dispatch should notify police personnel.
 - B. Responsibility of the EMT-Basic
 - 1. Emergency care of the patient is the EMT-Basic'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.
- XII. Special Reporting Situations
 - A. Established by state legislation and may vary from state to state
 - B. Commonly required reporting situations
 - 1. Abuse
 - a. Child
 - b. Elderly
 - c. Spouse
 - 2. Crime

- a. Wounds obtained by violent crime
 - b. Sexual assault
- C. Infectious disease exposure
- D. Patient restraint laws e.g. forcing someone to be transported against their will.
- E. Mentally incompetent, e.g., intoxication with injuries.

Refer to Guide for EMT's in Alaska for regulations on reporting, death certification, etc.

MODULE 1

Preparatory

Lesson 1-4

The Human Body

Declarative (What)

I. Anatomical Terms

A. Normal anatomical position

1. Person standing, facing forward
2. Palms facing forward

B. Anatomical terms - planes

1. Midline

- a. Imaginary line drawn vertically through the middle of the body:
Nose --> umbilicus (belly button)
- b. Divides the body into right and left.

2. Mid-axillary

- a. Imaginary line drawn vertically from the middle of the armpit to the ankle.
- b. Divides the body into anterior and posterior.

C. Descriptive anatomical terms

1. Torso
2. Medial
3. Lateral
4. Proximal
5. Distal
6. Superior
7. Inferior
8. Anterior
9. Posterior
10. Right and left
11. Mid-clavicular
12. Bilaterally
13. Dorsal
14. Ventral
15. Plantar
16. Palmar
17. Prone
18. Supine
19. Fowlers
20. Trendelenburg
21. Shock position

II. The Skeletal System

A. Function

1. Gives the body shape
2. Protects vital internal organs
3. Provides for body movement

B. Components

1. Skull - houses and protects the brain
2. Face
 - a. Orbit
 - b. Nasal bone
 - c. Maxilla
 - d. Mandible (jaw)
 - e. Zygomatic bones (cheeks)
3. Spinal Column
 - a. Cervical (neck) - 7
 - b. Thoracic (upper back) - 12

- c. Lumbar (lower back) - 5
- d. Sacral (back wall of the pelvis) - 5
- e. Coccyx (tailbone) - 4
- 4. Thorax
 - a. Ribs
 - (1) 12 pair
 - (2) Attached posterior to the thoracic vertebrae.
 - (3) Pairs 1-10 are attached anterior to the sternum.
 - (4) Pairs 11 and 12 are floating.
 - b. Sternum (Breastbone)
 - (1) Manubrium (superior portion of sternum)
 - (2) Body (middle)
 - (3) Xiphoid process (inferior portion of sternum)
- 5. Pelvis
 - a. Iliac crest (wings of pelvis)
 - b. Pubis (anterior portion of pelvis)
 - c. Ischium (inferior portion of pelvis)
- 6. Lower extremities
 - a. Greater trochanter (ball) and acetabulum (socket of hip bone)
[Make up the hip joint]
 - b. Femur (thigh)
 - c. Patella (kneecap)
 - d. Tibia (shin - lower leg)
 - e. Fibula (lower leg)
 - f. Medial and lateral malleolus - are the surface landmarks of the ankle joint.
 - g. Tarsals and metatarsals (foot)
 - h. Calcaneus (heel)
 - i. Phalanges (toes)
- 7. Upper extremities
 - a. Clavicle (collar bone)
 - b. Scapula (shoulder blade)
 - c. Acromion (tip of shoulder)
 - d. Humerus (superior portion of upper extremity)
 - e. Olecranon (elbow)
 - f. Radius (lateral bone of forearm)
 - g. Ulna (medial bone of forearm)
 - h. Carpals (wrist)
 - i. Metacarpals (hand)
 - j. Phalanges (fingers)

C. Joints

- 1. Where bones connect to other bones
- 2. Types
 - a. Ball and socket
 - b. Hinged

III. Body Systems

A. Respiratory

- 1. Nose and mouth
- 2. Pharynx
 - a. Oropharynx
 - b. Nasopharynx

3. Epiglottis - a leaf-shaped structure that prevents food and liquid from entering the trachea during swallowing.
4. Trachea (windpipe)
5. Cricoid cartilage - firm cartilage ring forming the lower portion of the larynx.
6. Larynx (voice box)
7. Bronchi - two major branches of the trachea to the lungs. Bronchus subdivides into smaller air passages ending at the alveoli.
8. Lungs
9. Diaphragm
 - a. Inhalation (active)
 - (1) Diaphragm and intercostal muscles contract, increasing the size of the thoracic cavity.
 - (a) Diaphragm moves slightly downward, flares lower portion of rib cage.
 - (b) Ribs move upward/outward.
 - (2) Air flows into the lungs.
 - b. Exhalation
 - (1) Diaphragm and intercostal muscles relax decreasing the size of the thoracic cavity.
 - (a) Diaphragm moves upward.
 - (b) Ribs move downward/inward.
 - (2) Air flows out of the lungs.
10. Respiratory physiology
 - a. Alveolar/capillary exchange
 - (1) Oxygen-rich air enters the alveoli during each inspiration.
 - (2) Oxygen-poor blood in the capillaries passes into the alveoli.
 - (3) Oxygen enters the capillaries as carbon dioxide enters the alveoli.
 - b. Capillary/cellular exchange
 - (1) Cells give up carbon dioxide to the capillaries.
 - (2) Capillaries give up oxygen to the cells.
 - c. Adequate breathing
 - (1) Normal rate
 - (a) Adult - 12-20/minute
 - (b) Child - 15-30/minute
 - (c) Infant - 25-50/minute
 - (2) Rhythm
 - (a) Regular
 - (b) Irregular
 - (3) Quality
 - (a) Breath sounds - present and equal
 - (b) Chest expansion - adequate and equal
 - (c) Effort of breathing - use of accessory muscles - predominantly in infants and children
 - (4) Depth (tidal volume) - adequate
 - d. Inadequate breathing
 - (1) Rate - outside of normal ranges.
 - (2) Rhythm - irregular
 - (3) Quality
 - (a) Breath sounds - diminished or absent

- (b) Chest expansion - unequal or inadequate
 - (c) Increased effort of breathing - use of accessory muscles - predominantly in infants and children
 - (4) Depth (tidal volume) - inadequate/shallow
 - (5) The skin may be pale or cyanotic (blue) and cool and clammy.
 - (6) There may be retractions above the clavicles, between the ribs and below the rib cage, especially in children.
 - (7) Nasal flaring may be present, especially in children.
 - (8) In infants, there may be "seesaw" breathing where the abdomen and chest move in opposite directions.
 - (9) Agonal respirations (occasional gasping breaths) may be seen just before death.
11. Infant and child anatomy considerations
- a. Mouth and nose - in general: All structures are smaller and more easily obstructed than in adults.
 - b. Pharynx - infants' and children's tongues take up proportionally more space in the mouth than adults.
 - c. Trachea (windpipe)
 - (1) Infants and children have narrower tracheas that are obstructed more easily by swelling.
 - (2) The trachea is softer and more flexible in infants and children.
 - d. Cricoid cartilage - like other cartilage in the infant and child, the cricoid cartilage is less developed and less rigid.
 - e. Diaphragm - chest wall is softer, infants and children tend to depend more heavily on the diaphragm for breathing.
- B. Circulatory (Cardiovascular)
- 1. Heart
 - a. Structure/function
 - (1) Atrium
 - (a) Right - receives blood from the veins of the body and the heart, pumps oxygen-poor blood to the right ventricle.
 - (b) Left - receives blood from the pulmonary veins (lungs), 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
 - (1) Heart is more than a muscle.
 - (2) Specialized contractile and conductive tissue in the heart
 - (3) Electrical impulses
 - 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, 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 lower extremities with blood.
 - (c) Pulsations can be palpated in the groin area (the crease between the abdomen and thigh).
 - (6) Radial
 - (a) Major artery of the lower arm.
 - (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 (sphygmomanometer) 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. Arteriole - the smallest branch 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. Venule - the smallest branch of a vein 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) Venae cavae
 - (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
 - (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. Inadequate circulation - Shock (hypoperfusion): A state of profound depression of the vital processes of the body, characterized by signs and symptoms such as: Pale, cyanotic (blue-gray color), cool, clammy skin, rapid, weak pulse, rapid and shallow breathing, restlessness, anxiety or mental dullness, nausea and vomiting, reduction in total blood volume, low or decreasing blood pressure and subnormal temperature.

10. Perfusion

- a. Definition - circulation of blood through an organ or a structure.
- b. Perfusion is the delivery of oxygen and other nutrients to the cells of all organ systems and the removal of waste products.
- c. Hypoperfusion is the inadequate circulation of blood through an organ or a structure.

C. Musculoskeletal

1. The muscular system function

- a. Gives the body shape.
- b. Protects internal organs.
- c. Provides for movement.

2. Types

- a. Voluntary (skeletal)
 - (1) Attached to the bones.
 - (2) Form the major muscle mass of the body.
 - (3) Under control of the nervous system and brain. Can be contracted and relaxed by the will of the individual.
 - (4) Responsible for movement.
- b. Involuntary (smooth)
 - (1) Found in the walls of the tubular structures of the gastrointestinal tract and urinary system, as well as the blood vessels and bronchi.
 - (2) Control the flow through these structures.
 - (3) Carry out the automatic muscular functions of the body.
 - (4) Individuals have no direct control over these muscles.
 - (5) Respond to stimuli such as stretching, heat, and cold.

- c. Cardiac
 - (1) Found only in the heart.
 - (2) Involuntary muscle - has its own supply of blood through the coronary artery system.
 - (3) Can tolerate interruption of blood supply for only very short periods.
 - (4) Automaticity - the ability of the muscle to contract on its own.
- D. Nervous system
 - 1. Function - controls the voluntary and involuntary activity of the body.
 - 2. Components
 - a. Central nervous system
 - (1) Brain - located within the cranium.
 - (2) Spinal cord - located within the spinal column from the brain through the lumbar vertebrae.
 - b. Peripheral nervous system
 - (1) Sensory - carry information from the body to the brain and spinal cord.
 - (2) Motor - carry information from the brain and spinal cord to the body.
- E. Skin
 - 1. Function
 - a. Protects the body from the environment, bacteria and other organisms.
 - b. Helps regulate the temperature of the body.
 - c. Senses heat, cold, touch, pressure and pain; transmits this information to the brain and spinal cord.
 - 2. Layers
 - a. Epidermis - outermost layer of skin.
 - b. Dermis - deeper layer of skin containing sweat and sebaceous glands, hair follicles, blood vessels and nerve endings.
 - c. Subcutaneous layer
- F. Endocrine system function - secretes chemicals, such as insulin and adrenalin, responsible for regulating body activities and functions

Preparatory

Lesson 1-5

Baseline Vital Signs and SAMPLE History

Declarative (What)

I. General Information

- A. Chief complaint - why EMS was notified
- B. Age - years, months, days
- C. Sex - male or female
- D. Race

II. Baseline Vital Signs

- A. Breathing - assessed by observing the patient's chest rise and fall.
 - 1. Rate is determined by counting the number of breaths in a 30-second period and multiplying by 2. Care should be taken not to inform the patient, to avoid influencing the rate.
 - 2. Quality of breathing can be determined while assessing the rate. Quality can be placed in 1 of 4 categories:
 - a. Normal - average chest wall motion, not using accessory muscles.
 - b. Shallow - slight chest or abdominal wall motion.
 - c. Labored
 - (1) An increase in the effort of breathing
 - (2) Grunting and stridor
 - (3) Often characterized by the use of accessory muscles
 - (4) Nasal flaring, supraclavicular and intercostal retractions in infants and children
 - (5) Sometimes gasping
 - d. Noisy - an increase in the audible sound of breathing. May include snoring, wheezing, gurgling, crowing.
- B. Pulse
 - 1. Initially a radial pulse should be assessed in all patients one year or older. In patients less than one year of age a brachial pulse should be assessed.
 - 2. If the pulse is present, assess rate and quality.
 - a. Rate is the number of beats felt in 30 seconds multiplied by 2.
 - b. Quality of the pulse can be characterized as:
 - (1) Strong
 - (2) Weak
 - (3) Regular
 - (4) Irregular
 - 3. If peripheral pulse is not palpable, assess carotid pulse.
 - a. Use caution. Avoid excess pressure on geriatrics.
 - b. Never attempt to assess carotid pulse on both sides at one time.
- C. Assess skin to determine perfusion.
 - 1. The patient's color should be assessed in the nail beds, oral mucosa, and conjunctiva.
 - a. In infants and children, palms of hands and soles of feet should be assessed.
 - b. Normal skin - pink
 - c. Abnormal skin colors
 - (1) Pale - indicating poor perfusion (impaired blood flow)
 - (2) Cyanotic (blue-gray) - indicating inadequate oxygenation or poor perfusion
 - (3) Flushed (red) - indicating exposure to heat or carbon monoxide poisoning.
 - (4) Jaundice (yellow) - indicating liver abnormalities
 - 2. The patient's temperature should be assessed by placing the back of your hand on the patient's skin.

- a. Normal - warm
 - b. Abnormal skin temperatures
 - (1) Hot - indicating fever or an exposure to heat.
 - (2) Cool - indicating poor perfusion or exposure to cold.
 - (3) Cold - indicates extreme exposure to cold.
 - 3. Assess the condition of the patient's skin.
 - a. Normal - dry
 - b. Abnormal - skin is wet, moist, or dry.
 - 4. Assess capillary refill in infants and children less than six years of age.
 - a. Capillary refill in infants and children is assessed by pressing on the patient's skin or nail beds and determining time for return to initial color.
 - b. Normal capillary refill in infants and children is < 2 seconds.
 - c. Abnormal capillary refill in infants and children is > 2 seconds.
 - D. Pupils are assessed by briefly shining a light into the patient's eyes, and determining size and reactivity.
 - 1. Dilated (very big), normal, or constricted (small).
 - 2. Equal or unequal
 - 3. Reactivity is whether or not the pupils change in response to the light.
 - a. Reactive - change when exposed to light
 - b. Non-reactive - do not change when exposed to light
 - c. Equally or unequally reactive
 - 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 two methods of obtaining blood pressure.
 - (1) Auscultation: In this case the EMT-Basic will listen for the systolic and diastolic sounds.
 - (2) Palpation: In certain situations, the systolic blood pressure may be measured by feeling for return of pulse with deflation of the cuff.
 - 2. Blood pressure should be measured in all patients older than 3 years of age.
 - 3. The general assessment of the infant or child patient, such as sick appearing, in respiratory distress, or unresponsive, is more valuable than vital sign numbers.
 - F. Vital sign reassessment
 - 1. Vital signs should be assessed and recorded every 15 minutes at a minimum in a stable patient.
 - 2. Vital signs should be assessed and recorded every 5 minutes in the unstable patient.
 - 3. Vital signs should be assessed following all medical interventions.
- III. Obtain an SAMPLE history.
- A. Signs/Symptoms

1. **Sign** - any medical or trauma condition displayed by the patient and identifiable by the EMT-Basic, e.g., Hearing = respiratory distress, Seeing = bleeding, Feeling = skin temperature.
 2. **Symptom** - any condition described by the patient, e.g., shortness of breath.
- B. Allergies
1. Medications
 2. Food
 3. Environmental allergies
 4. Consider medical identification tag
- C. Medications
1. Prescription
 - a. Current
 - b. Recent
 - c. Birth control pills
 2. Non-prescription
 - a. Current
 - b. Recent
 3. Consider medical identification tag
- D. Pertinent Past History
1. Medical
 2. Surgical
 3. Trauma
 4. Consider medical identification tag
- E. Last oral intake: Solid or liquid
1. Time
 2. Quantity
- F. Events leading to the injury or illness
1. Chest pain with exertion
 2. Chest pain while at rest

MODULE 1

Preparatory

Lesson 1-6

Lifting and Moving Patients

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 (hypoperfusion)
- 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-Basic'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-Basic gets behind patient and brings cervical spine into neutral in-line position and provides manual immobilization.
 - b. A second EMT-Basic applies cervical immobilization device as the third EMT-Basic first places long backboard near the door and then moves to the passenger seat.
 - c. The second EMT-Basic supports the thorax as the third EMT-Basic frees the patient's legs from the pedals.
 - d. At the direction of the second EMT-Basic, he and the third EMT-Basic 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-Basic usually cannot support the patient's head any longer, another available EMT-Basic or a bystander supports the patient's head as the first EMT-Basic 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-Basic and the second EMT-Basic lower the patient onto it.
 - g. The second EMT-Basic and the third EMT-Basic 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

MODULE 2

Airway

Lesson 2-1

Airway

I. Anatomy review

A. Respiratory

1. Nose and mouth
2. Pharynx
 - a. Oropharynx
 - b. Nasopharynx
3. Epiglottis - a leaf-shaped structure that prevents food and liquid from entering the trachea during swallowing.
4. Trachea (windpipe)
5. Cricoid cartilage - firm cartilage ring forming the lower portion of the larynx.
6. Larynx (voice box)
7. Bronchi - two major branches of the trachea to the lungs. Bronchus subdivides into smaller air passages ending at the alveoli.
8. Lungs
9. Diaphragm
 - a. Inhalation (active)
 - (1) Diaphragm and intercostal muscles contract, increasing the size of the thoracic cavity.
 - (a) Diaphragm moves slightly downward, flares lower portion of rib cage.
 - (b) Ribs move upward/outward.
 - (2) Air flows into the lungs.
 - b. Exhalation
 - (1) Diaphragm and intercostal muscles relax, decreasing the size of the thoracic cavity.
 - (a) Diaphragm moves upward.
 - (b) Ribs move downward/inward.
 - (2) Air flows out of the lungs.
10. Respiratory physiology
 - a. Alveolar/capillary exchange
 - (1) Oxygen-rich air enters the alveoli during each inspiration.
 - (2) Oxygen-poor blood in the capillaries passes into the alveoli.
 - (3) Oxygen enters the capillaries as carbon dioxide enters the alveoli.
 - b. Capillary/cellular exchange
 - (1) Cells give up carbon dioxide to the capillaries.
 - (2) Capillaries give up oxygen to the cells.
 - c. Adequate breathing
 - (1) Normal Rate
 - (a) Adult - 12-20/minute
 - (b) Child - 15-30/minute
 - (c) Infant - 25-50/minute
 - (2) Rhythm
 - (a) Regular
 - (b) Irregular
 - (3) Quality
 - a) Breath sounds - present and equal
 - b) Chest expansion - adequate and equal
 - (c) Minimum effort of breathing - use of accessory muscles - predominantly in infants and children

- (4) Depth (tidal volume) - adequate
- d. Inadequate breathing
 - (1) Rate - outside of normal ranges.
 - (2) Rhythm - irregular
 - (3) Quality
 - (a) Breath sounds - diminished or absent
 - (b) Chest expansion - unequal or inadequate
 - (c) Increased effort of breathing - use of accessory muscles - predominantly in infants and children
 - (4) Depth (tidal volume) - inadequate/shallow
 - (5) The skin may be pale or cyanotic (blue) and cool and clammy.
 - (6) There may be retractions above the clavicles, between the ribs and below the rib cage, especially in children.
 - (7) Nasal flaring may be present, especially in children.
 - (8) In infants, there may be "seesaw" breathing where the abdomen and chest move in opposite directions.
 - (9) Agonal respirations (occasional gasping breaths) may be seen just before death.

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

B. Adequate and inadequate artificial ventilation

- 1. An EMT-Basic is artificially ventilating a patient adequately when:
 - a. The chest rises and falls with each artificial ventilation.
 - b. The rate is sufficient, approximately 12 per minute for adults and 20 times per minute for children and infants.
 - c. The tidal volume is appropriate for the patient.
 - d. Heart rate returns to normal with successful artificial ventilation.
 - e. Other improvements are seen i.e. skin color improves.
- 2. Artificial ventilation is inadequate when:
 - a. The chest does not rise and fall with artificial ventilation.
 - b. Air escapes from around the mask.
 - c. The stomach becomes visibly distended.
 - d. Not enough or too much volume is delivered.
 - e. The rate is too slow or too fast.
 - f. Heart rate does not return to normal with artificial ventilation.

II. Opening the Airway

- A. Head-tilt chin-lift when no neck injury suspected - review technique learned in BLS course.

- B. Jaw thrust when EMT-Basic suspects spinal injury - review technique learned in BLS course.
 - C. Assess need for suctioning.
- III Techniques of Suctioning
- A. Body substance isolation
 - B. Purpose
 - 1. Remove blood, other liquids and food particles from the airway.
 - 2. Some suction units are inadequate for removing solid objects like teeth, foreign bodies and food.
 - 3. A patient needs to be suctioned immediately when a gurgling sound is heard with artificial ventilation.
 - C. Types of units
 - 1. Suction devices
 - a. Mounted
 - b. Portable
 - (1) Electrical
 - (2) Hand operated
 - 2. Suction catheters
 - a. Hard or rigid ("tonsil sucker," "tonsil tip")
 - (1) Used to suction the mouth and oropharynx of an unresponsive patient.
 - (2) Should be inserted only as far as you can see.
 - (3) Use rigid catheter for infants and children, but take caution not to touch back of airway.
 - b. Soft (French)
 - (1) Useful for suctioning the nasopharynx and in other situations where a rigid catheter cannot be used.
 - (2) Should be measured so that it is inserted only as far as the base of the tongue.
- D. Techniques of use
- 1. Suction device should be inspected on a regular basis before it is needed. A properly functioning unit with a gauge should generate 300 mmHg vacuum. A battery operated unit should have a charged battery.
 - 2. Turn on the suction unit.
 - 3. Attach a catheter.
 - a. Use rigid catheter when suctioning mouth of an infant or child.
 - b. Often will need to suction nasal passages; should use a bulb suction or French catheter with low to medium suction.
 - 4. Insert the catheter into the oral cavity without suction, if possible. Insert only to the base of the tongue.
 - 5. Apply suction. Move the catheter tip side to side.
 - 6. Suction for no more than 15 seconds at a time.
 - a. In infants and children, shorter suction time should be used.
 - b. If the patient has secretions or emesis that cannot be removed quickly and easily by suctioning, the patient should be log rolled and the oropharynx should be cleared.
 - c. If patient produces frothy secretions as rapidly as suctioning can remove, suction for 15 seconds, artificially ventilate for two minutes, then suction for 15 seconds, and continue in that manner. Consult medical direction for this situation.
 - 7. If necessary, rinse the catheter and tubing with water to prevent obstruction of the tubing from dried material.

IV. Techniques of Artificial Ventilation

A. In order of preference, the methods for ventilating a patient by the EMT-Basic are as follows:

1. Mouth-to-mask
2. Two-person bag-valve-mask
3. Flow restricted, oxygen-powered ventilation device
4. One-person bag-valve-mask

B. Body substance isolation

C. Mouth-to-mouth/mouth-to-stoma

1. Always try to use BSI precautions.
2. A barrier device is recommended.
 - a. Follow the manufacturer's directions.
3. Open the airway
4. Look, Listen, and feel
5. Apply the barrier device
6. Give two breaths
7. Check for pulse
8. If pulse is present, ventilate at an age-appropriate rate until:
 - a. Patient breaths adequately spontaneously;
 - b. Relieved by other rescuers;
 - c. Other ventilation equipment is available;
9. Asses the adequacy of the rescuer provided ventilation.

D. Mouth-to-mask

1. Review technique learned in BLS course.
2. The mask should be connected to high flow oxygen = 15 liters per minute.

E. Bag-valve-mask

1. The bag-valve-mask consists of a self-inflating bag, one-way valve, face mask, oxygen reservoir. It needs to be connected to oxygen to perform most effectively.
2. Bag-valve-mask issues
 - a. Volume of approximately 1,600 milliliters
 - b. Provides less volume than mouth-to-mask
 - c. Single EMT-Basic may have difficulty maintaining an airtight seal.
 - d. Two EMT-Basics using the device will be more effective.
 - e. Position self at top of patient's head for optimal performance.
 - f. Adjunctive airways (oral or nasal) may be necessary in conjunction with bag-valve-mask.
 - g. The bag-valve-mask should have:
 - (1) A self-refilling bag that is easily cleaned and sterilized.
 - (2) A non-jam valve that allows a maximum oxygen inlet flow of 15/lpm.
 - (3) No pop-off valve, or the pop-off valve must be disabled. Failure to do so may result in inadequate artificial ventilations.
 - (4) Standardized 15/22 mm fittings.
 - (5) An oxygen inlet and reservoir to allow for high concentration of oxygen.
 - (6) A true valve for nonrebreather.
 - (7) Should perform in all environmental conditions and temperature extremes.
 - (8) Available in infant, child and adult sizes.
3. Use when no trauma is suspected.

- a. After opening airway, select correct mask size (adult, infant or child).
 - b. Position thumbs over top half of mask, index and middle fingers over bottom half.
 - c. Place apex of mask over bridge of nose, then lower mask over mouth and upper chin. If mask has large round cuff surrounding a ventilation port, center port over mouth.
 - d. Use ring and little fingers to bring jaw up to mask.
 - e. Connect bag to mask if not already done.
 - f. Have assistant squeeze bag with two hands until chest rises.
 - g. If alone, form a "C" around the ventilation port with thumb and index finger; use middle, ring and little fingers under jaw to maintain chin lift and complete the seal.
 - h. Repeat a minimum of every 5 seconds for adults and every 3 seconds for children and infants.
 - i. If chest does not rise and fall, re-evaluate.
 - (1) If chest does not rise, reposition head.
 - (2) If air is escaping from under the mask, reposition fingers and mask.
 - (3) Check for obstruction.
 - (4) If chest still does not rise and fall, use alternative method of artificial ventilation, e.g., pocket mask, manually triggered device.
 - j. If necessary, consider use of adjuncts.
 - (1) Oral airway
 - (2) Nasal airway
4. Use with suspected trauma
- a. After opening airway, select correct mask size (adult, infant or child).
 - b. Immobilize head and neck, e.g., have an assistant hold head manually or use your knees to prevent movement.
 - c. Position thumbs over top half of mask, index and middle fingers over bottom half.
 - d. Place apex of mask over bridge of nose, then lower mask over mouth and upper chin. If mask has large round cuff surrounding a ventilation port, center port over mouth.
 - e. Use ring and little fingers to bring jaw up to mask without tilting head or neck.
 - f. Connect bag to mask if not already done.
 - g. Have assistant squeeze bag with two hands until chest rises.
 - h. Repeat every 5 seconds for adults and every 3 seconds for children and infants, continuing to hold jaw up without moving head or neck.
 - i. If chest does not rise, re-evaluate.
 - (1) If abdomen rises, reposition jaw.
 - (2) If air is escaping from under the mask, reposition fingers and mask.
 - (3) Check for obstruction.
 - (4) If chest still does not rise, use alternative method of artificial ventilation, e.g., pocket mask.
 - j. If necessary, consider use of adjuncts.
 - (1) Oral airway

(2) Nasal airway

F. Flow restricted, oxygen-powered ventilation devices

1. Flow restricted, oxygen-powered ventilation devices (for use in adults only) should provide
 - a. A peak flow rate of 100% oxygen at up to 40 lpm.
 - b. An inspiratory pressure relief valve that opens at approximately 60 centimeters water and vents any remaining volume to the atmosphere or ceases gas flow.
 - c. An audible alarm that sounds whenever the relief valve pressure is exceeded.
 - d. Satisfactory operation under ordinary environmental conditions and extremes of temperature.
 - e. A trigger positioned so that both hands of the EMT-Basic can remain on the mask to hold it in position.
2. Use when no neck injury is suspected
 - a. After opening airway, insert correct size oral or nasal airway and attach adult mask.
 - b. Position thumbs over top half of mask, index and middle fingers over bottom half.
 - c. Place apex of mask over bridge of nose, then lower mask over mouth and upper chin.
 - d. Use ring and little fingers to bring jaw up to mask.
 - e. Connect flow restricted, oxygen-powered ventilation device to mask if not already done.
 - f. Trigger the flow restricted, oxygen-powered ventilation device until chest rises.
 - g. Repeat every 5 seconds.
 - h. If necessary, consider use of adjuncts.
 - i. If chest does not rise, re-evaluate.
 - (1) If abdomen rises, reposition head.
 - (2) If air is escaping from under the mask, reposition fingers and mask.
 - (3) If chest still does not rise, use alternative method of artificial ventilation, e.g., pocket mask.
 - (4) Check for obstruction.
3. Use when there is suspected neck injury.
 - a. After opening airway, attach adult mask.
 - b. Immobilize head and neck, e.g., have an assistant hold head manually or use your knees to prevent movement.
 - c. Position thumbs over top half of mask, index and middle fingers over bottom half.
 - d. Place apex of mask over bridge of nose, then lower mask over mouth and upper chin.
 - e. Use ring and little fingers to bring jaw up to mask without tilting head or neck.
 - f. Connect flow restricted, oxygen-powered ventilation device to mask, if not already done.
 - g. Trigger the flow restricted, oxygen-powered ventilation device until chest rises.
 - h. Repeat every 5 seconds.
 - i. If necessary, consider use of adjuncts.
 - j. If chest does not rise and fall, re-evaluate.

- (1) If chest does not rise and fall, reposition jaw.
 - (2) If air is escaping from under the mask, reposition fingers and mask.
 - (3) If chest still does not rise, use alternative method of artificial ventilation, e.g., pocket mask.
 - (4) Check for obstruction.
- G. Bag to stoma or tracheostomy tube
1. Definition of tracheostomy - an artificial permanent opening in the trachea.
 2. If unable to artificially ventilate, try suction, then artificial ventilation through mouth and nose; sealing stoma may improve ability to artificially ventilate from above or may clear obstruction.
 3. Need to seal the mouth and nose when air is escaping when artificially ventilating at the stoma.
- H. Bag-valve-mask to stoma - use infant and child mask to make seal. Technique otherwise very similar to artificially ventilating through mouth. Head and neck do not need to be positioned.

V. Airway Adjuncts

- A. Oropharyngeal (oral) airways
1. Oropharyngeal airways may be used to assist in maintaining an open airway on unresponsive patients without a gag reflex. Patients with a gag reflex will vomit.
 2. Select the proper size: Measure from the corner of the patient's lips to the bottom of the earlobe or angle of jaw.
 3. Open the patient's mouth.
 4. In adults, to avoid obstructing the airway with the tongue, insert the airway upside down, with the tip facing toward the roof of the patient's mouth.
 5. Advance the airway gently until resistance is encountered. Turn the airway 180 degrees so that it comes to rest with the flange on the patient's teeth.
 6. Another method of inserting an oral airway is to insert it right side up, using a tongue depressor to press the tongue down and forward to avoid obstructing the airway. This is the preferred method for airway insertion in an infant or child.
- B. Nasopharyngeal (nasal) airways
1. Nasopharyngeal airways are less likely to stimulate vomiting and may be used on patients who are responsive but need assistance keeping the tongue from obstructing the airway. Even though the tube is lubricated, this is a painful stimulus.
 2. Select the proper size: Measure from the tip of the nose to the tip of the patient's ear. Also consider diameter of airway in the nostril.
 3. Lubricate the airway with a water soluble lubricant.
 4. Insert it posteriorly. Bevel should be toward the base of the nostril or toward the septum.
 5. If the airway cannot be inserted into one nostril, try the other nostril.

VI. Oxygen

- A. Oxygen cylinders
1. Different sizes
 - a. D cylinder has 350 liters
 - b. E cylinder has 625 liters
 - c. M cylinder has 3,000 liters

- d. G cylinder has 5,300 liters
 - e. H cylinder has 6,900 liters
 - 2. Need to handle carefully since their contents are under pressure.
 - 3. Tanks should be positioned to prevent falling and blows to the valve-gauge assembly and secured during transport.
 - B. Pressure regulators
 - 1. Full tank approximately 2000 psi. Varies with ambient temperature.
 - 2. Dry oxygen not harmful in short term; humidifier needed only for patient on oxygen for a long time. Not generally needed for prehospital care.
 - C. Operating procedures
 - 1. Remove protective seal.
 - 2. Quickly open, then shut, the valve.
 - 3. Attach regulator-flowmeter to tank.
 - 4. Attach oxygen device to flowmeter.
 - 5. Open flowmeter to desired setting.
 - 6. Apply oxygen device to patient.
 - 7. When complete, remove device from patient, then turn off valve and remove all pressure from the regulator.
 - D. Equipment for oxygen delivery
 - 1. Nonrebreather
 - a. Preferred method of giving oxygen to prehospital patients.
 - b. Up to 90% oxygen can be delivered.
 - c. Nonrebreather bag must be full before mask is placed on patient.
 - d. Flow rate should be adjusted so that when patient inhales, bag does not collapse (15 lpm).
 - e. 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 and infants and children have not been shown to be valid in the prehospital setting. Patients with chronic obstructive pulmonary disease and infants and children who require oxygen should receive high concentration oxygen.
 - f. Masks come in different sizes for adult, children and infants. Be sure to select the correct size mask.
 - 2. Nasal cannula - rarely the best method of delivering adequate oxygen to the prehospital patient. Should be used only when patients will not tolerate a nonrebreather mask, despite coaching from the EMT-Basic.
- VII. Special Considerations
- A. Patients with laryngectomies (stomas)
 - 1. A breathing tube may be present. If it is obstructed, suction it.
 - 2. Some patients have partial laryngectomies. If, upon artificially ventilating stoma, air escapes from the mouth or nose, close the mouth and pinch the nostrils.
 - B. Infant and child patients
 - 1. Place head in correct neutral position for the infant and extend a little past neutral for a child.
 - 2. Avoid excessive hyperextension of the head.
 - 3. Avoid excessive bag pressure - use only enough to make chest rise.
 - 4. 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 child or infant.
 - 5. Gastric distention is more common in children.

6. An oral or nasal airway may be considered when other procedures fail to provide a clear airway.
- C. Facial injuries
1. Because the blood supply to the face is so rich, blunt injuries to the face frequently result in severe swelling.
 2. For the same reason, bleeding into the airway from facial injuries can be a challenge to manage.
- D. Obstructions
1. Review the foreign body airway obstruction (FBAO) procedures that the students learned in their BLS training.
 2. When foreign body airway obstruction persists, EMT-Basics should perform three cycles of the FBAO procedure, then transport, continuing the FBAO procedure en route.
- E. Dental appliances
1. Dentures - ordinarily dentures should be left in place.
 2. Partial dentures (plates) may become dislodged during an emergency. Leave in place, but be prepared to remove it if it becomes dislodged.
- F. Prolonged transport
1. The unique environment of Alaska may cause difficulty in oxygen delivery over long transports. This problem is complicated by the finite supply of oxygen available to most rescue services.
 2. In the special circumstance of a prolonged transport that requires oxygen delivery, the EMT should consider modifying the traditional flow rates.
 - a. The patient who requires a non-rebreather mask may have the flow rate adjusted down so that oxygen delivery is maintained over a longer time.
 1. The reservoir bag should not be allowed to deflate during inspiration.
 2. The on-going assessment should direct this process.
 - a. Continuous monitoring is essential.
 - b. The patient should not be allowed to deteriorate in order to conserve oxygen
 - b. When performing artificial ventilation over a long transport attention should also be given to the available oxygen supply.
 1. The flow restricted oxygen powered ventilation device is preferred for this patient.
 2. If a reservoir bag is attached to the BVM, the flow should be adjusted so that the bag stays inflated but, does not continually purge oxygen.
 3. The BVM devices with corrugated tubing reservoir are more difficult to adjust to conserve oxygen because the EMT cannot gauge how much extra oxygen is flowing.

MODULE 3

Patient Assessment

Lesson 3-1

Scene Size-up

Declarative (What)

- I. Scene Size-up/Assessment
 - A. Body substance isolation review
 1. Eye protection if necessary
 2. Gloves if necessary
 3. Gown if necessary
 4. Mask if necessary
 - B. Scene safety
 1. Definition - an assessment to assure the well-being of the EMT-Basic.
 2. Personal protection - Is it safe to approach the patient?
 - a. Crash/rescue scenes
 - b. Toxic substances - low oxygen areas
 - c. Crime scenes - potential for violence
 - d. 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. Definition - an assessment of the scene and surroundings that will provide valuable information to the EMT-Basic.
 - D. Mechanism of injury/ nature of illness
 1. Medical
 - a. Nature of illness - determine from the patient, family or bystanders why EMS was activated.
 - b. Determine the total number of patients. 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: law enforcement, fire, rescue, ALS, utilities. EMT-Basic is less likely to call for help if involved in patient care.
 - (b) Begin triage.
 2. Trauma
 - a. Mechanism of injury - determine from the patient, family or bystanders and inspection of the scene what is the mechanism of injury.
 - b. 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-Basic is less likely to call for help when involved in patient care.
 - (b) Begin triage.

MODULE 3

Patient Assessment

Lesson 3-2

Initial Assessment

Declarative (What)

- I. General Impression of the Patient
 - A. Definition
 1. The general impression is formed to determine priority of care and is based on the EMT-Basic's immediate assessment of the environment and the patient's chief complaint.
 2. Determine if ill, i.e., medical or injured (trauma). If injured, identify mechanism of injury.
 3. Age
 4. Sex
 5. Race
 - B. Assess patient and determine if the patient has a life threatening condition.
 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 emergency medical technician, and explain that you are here to help.
 - B. Levels of mental status
 1. Alert
 2. Responds to Verbal stimuli.
 3. Responds to Painful stimuli.
 4. Unresponsive - no gag or cough
- III. Assess the Patient's Airway Status.
 - A. Responsive patient - Is the patient talking or crying?
 1. If yes, assess for adequacy of breathing.
 2. If no, open airway.
 - 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.
- IV. Assess the Patient's Breathing.
 - A. If breathing is adequate and the patient is responsive, oxygen may be indicated.
 - B. All responsive patients breathing <24 breaths per minute or <8 breaths per minute should receive high flow oxygen (defined as a 15 LPM nonrebreather mask).
 - C. If the patient is unresponsive and the breathing is adequate, open and maintain the airway and provide high concentration oxygen.
 - D. If the breathing is inadequate, open and maintain the airway, assist the patient's breathing and utilize ventilatory adjuncts. In all cases oxygen should be used.
 - E. If the patient is not breathing, open and maintain the airway and ventilate using ventilatory adjuncts. In all cases oxygen should be used.
- V. Assess the Patient's Circulation.
 - A. Assess the patient's pulse.
 1. The circulation is assessed by feeling for a radial pulse.
 - a. In a patient one year old or less, palpate a brachial pulse.
 - b. If no radial pulse is felt, palpate carotid pulse.

- (1) If pulseless, medical patient >12 years old, start CPR and apply automated external defibrillator (AED).
 - (2) Medical patient < 12 years old, start CPR.
 - (3) Trauma patient, start CPR.
 - 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 in infant and child patients.
 - a. Normal capillary refill is less than two seconds.
 - b. Abnormal capillary refill is greater than two seconds.
- VI. Identify Priority Patients.
 - A. Consider:
 1. Poor general impression
 2. Unresponsive patients - no gag or cough
 3. Responsive, not following commands
 4. Difficulty breathing
 5. Shock (hypoperfusion)
 6. Complicated childbirth
 7. Chest pain with BP <100 systolic
 8. Uncontrolled bleeding
 9. Severe pain anywhere
 - B. Expedite transport of the patient. Consider ALS back up.
- VII. Proceed to the appropriate focused history and physical examination.

MODULE 3

Patient

Assessment

Lesson 3-3

**History and Physical Exam:
Trauma**

I. Re-consider Mechanism of Injury

A. Significant mechanism of injury

1. Ejection from vehicle
2. Death in same passenger compartment
3. Falls > 20 feet
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 >10 feet
2. Bicycle collision
3. Vehicle in medium speed collision

II. Perform rapid trauma assessment on patients with significant mechanism of injury to determine life threatening injuries. In the responsive patient, symptoms should be sought before and during the trauma assessment.

A. Continue spinal stabilization.

B. Consider ALS request.

C. Reconsider transport decision.

D. Assess mental status.

E. As you inspect and palpate, look and feel for the following examples of injuries or signs of injury:

1. Deformities
2. Contusions
3. Abrasions
4. Punctures/penetrations
5. Burns
6. Tenderness
7. Lacerations
8. Swelling

F. Assess the head, inspect and palpate for injuries or signs of injury.

1. Deformities
2. Contusions
3. Abrasions

4. Punctures/penetrations
 5. Burns
 6. Tenderness
 7. Lacerations
 8. Swelling
 9. Crepitation
- G. Assess the neck, inspect and palpate for injuries or signs of injury.
1. Deformities
 2. Contusions
 3. Abrasions
 4. Punctures/penetrations
 5. Burns
 6. Tenderness
 7. Lacerations
 8. Swelling
 9. Jugular vein distension (JVD)
 10. Crepitation
- H. Apply cervical spinal immobilization collar (CSIC). May use information from the head injury lesson at this time.
- I. Assess the chest, inspect and palpate for:
1. Injuries or signs of injury
 2. Deformities
 3. Contusions
 4. Abrasions
 5. Punctures/penetrations
 6. Burns
 7. Tenderness
 8. Lacerations
 9. Swelling
 10. Paradoxical motion
 11. Crepitation
 12. Breath sounds in the apices, mid-clavicular line, bilaterally and at the bases, mid-axillary line, bilaterally
 - a. Present
 - b. Absent
 - c. Equal
- J. Assess the abdomen, inspect and palpate for injuries or signs of injury.
1. Deformities
 2. Contusions
 3. Abrasions
 4. Punctures/penetrations
 5. Burns
 6. Tenderness
 7. Lacerations
 8. Swelling
 9. Firm
 10. Soft
 11. Distended
- K. Assess the pelvis, inspect and palpate for injuries or signs of injury.
1. Deformities
 2. Contusions
 3. Abrasions

4. Punctures/penetrations
 5. Burns
 6. Tenderness
 7. Lacerations
 8. Swelling
 9. If no pain is noted, gently compress the pelvis to determine tenderness or motion.
- L. Assess all four extremities, inspect and palpate for injuries or signs of injury.
1. Deformities
 2. Contusions
 3. Abrasions
 4. Punctures/penetrations
 5. Burns
 6. Tenderness
 7. Lacerations
 8. Swelling
 9. Distal pulse
 10. Sensation
 11. Motor function
- M. Roll patient with spinal precautions and assess posterior body, inspect and palpate, examining for injuries or signs of injury.
- N. Assess baseline vital signs.
- O. Assess SAMPLE history.
- III. For patients with no significant mechanism of injury, e.g., cut finger
- A. Perform focused history and physical exam of injuries based on the components of the rapid assessment. The focused assessment is performed on the specific injury site.
 - B. Assess baseline vital signs.
 - C. Assess SAMPLE history.

MODULE 3

Patient Assessment

Lesson 3-4

Focused History and Physical Exam: Medical

Declarative (What)

- I. Assess History of Present Illness.
 - A. Assess complaints and signs or symptoms.
 1. O-P-Q-R-S-T
 - a. Onset
 - b. Provocation
 - c. Quality
 - d. Radiation
 - e. Severity
 - f. Time
 2. Assess SAMPLE History.
 3. Perform rapid assessment.
 - a. Assess the head if necessary.
 - b. Assess the neck if necessary.
 - c. Assess the chest if necessary.
 - d. Assess the abdomen if necessary.
 - e. Assess the pelvis if necessary.
 - f. Assess the extremities if necessary.
 - g. Assess the posterior body if necessary.
 4. Assess baseline vital signs.
 5. Provide emergency medical care based on signs and symptoms in consultation with medical direction.
- II. Unresponsive Medical Patients
 - A. Perform rapid assessment.
 1. Assess the head.
 2. Assess the neck.
 3. Assess the chest.
 4. Assess the abdomen.
 5. Assess the pelvis.
 6. Assess the extremities.
 7. Assess the posterior aspect of the body.
 - B. Assess baseline vital signs.
 - C. Position patient to protect airway.
 - D. Obtain SAMPLE history from bystander, family, friends prior to leaving.

MODULE 3

Patient Assessment

Lesson 3-5

Detailed Physical Exam

Declarative (What)

I. Detailed Physical Exam

- A. Patient and injury specific, e.g., cut finger would not require the detailed physical exam.
- B. Perform a detailed physical examination on the patient to gather additional information.
 1. As you inspect and palpate, look and/or feel for the following examples of injuries or signs of injury:
 - a. Deformities
 - b. Contusions
 - c. Abrasions
 - d. Punctures/penetrations
 - e. Burns
 - f. Tenderness
 - g. Lacerations
 - h. Swelling
 2. Assess the head, inspect and palpate for injuries or signs of injury.
 - a. Deformities
 - b. Contusions
 - c. Abrasions
 - d. Punctures/penetrations
 - e. Burns
 - f. Tenderness
 - g. Lacerations
 - h. Swelling
 3. Assess the face, inspect and palpate for injuries or signs of injury.
 - a. Deformities
 - b. Contusions
 - c. Abrasions
 - d. Punctures/penetrations
 - e. Burns
 - f. Tenderness
 - g. Lacerations
 - h. Swelling
 4. Assess the ears, inspect and palpate for injuries or signs of injury .
 - a. Deformities
 - b. Contusions
 - c. Abrasions
 - d. Punctures/penetrations
 - e. Burns
 - f. Tenderness
 - g. Lacerations
 - h. Swelling
 - i. Drainage
 5. Assess the eyes, inspect for injuries or signs of injury.
 - a. Deformities
 - b. Contusions
 - c. Abrasions
 - d. Punctures/penetrations
 - e. Burns
 - f. Tenderness
 - g. Lacerations

- h. Swelling
 - i. Discoloration
 - j. Unequal pupils
 - k. Foreign bodies
 - l. Blood in anterior chamber
6. Assess the nose, inspect and palpate for injuries or signs of injury.
- a. Deformities
 - b. Contusions
 - c. Abrasions
 - d. Punctures/penetrations
 - e. Burns
 - f. Tenderness
 - g. Lacerations
 - h. Swelling
 - i. Drainage
 - j. Bleeding
7. Assess the mouth, inspect for injuries or signs of injury.
- a. Deformities
 - b. Contusions
 - c. Abrasions
 - d. Punctures/penetrations
 - e. Burns
 - f. Tenderness
 - g. Lacerations
 - h. Swelling
 - i. Teeth
 - j. Obstructions
 - k. Swollen or lacerated tongue
 - l. Odors
 - m. Discoloration
8. Assess the neck, inspect and palpate for injuries or signs of injury.
- a. Deformities
 - b. Contusions
 - c. Abrasions
 - d. Punctures/penetrations
 - e. Burns
 - f. Tenderness
 - g. Lacerations
 - h. Swelling
 - i. Jugular vein distension
 - j. Crepitance
9. Assess the chest, inspect and palpate for injuries or signs of injury.
- a. Deformities
 - b. Contusions
 - c. Abrasions
 - d. Punctures/penetrations
 - e. Burns
 - f. Tenderness
 - g. Lacerations
 - h. Swelling
 - i. Crepitance
 - j. Paradoxical motion

- k. Breath sounds in the apices, mid-clavicular line, bilaterally and at the bases, mid-axillary line, bilaterally.
 - (1) Present
 - (2) Absent
 - (3) Equal
- 10. Assess the abdomen, inspect and palpate for injuries or signs of injury.
 - a. Deformities
 - b. Contusions
 - c. Abrasions
 - d. Punctures/penetrations
 - e. Burns
 - f. Tenderness
 - g. Lacerations
 - h. Swelling
 - i. Firm
 - j. Soft
 - k. Distended
- 11. Assess the pelvis, inspect and palpate for injuries or signs of injury.
 - a. Deformities
 - b. Contusions
 - c. Abrasions
 - d. Punctures/penetrations
 - e. Burns
 - f. Tenderness
 - g. Lacerations
 - h. Swelling
 - i. If the patient does not complain of pain or is unresponsive, gently flex and compress the pelvis to determine stability.
- 12. Assess all four extremities, inspect and palpate for injuries or signs of injury.
 - a. Deformities
 - b. Contusions
 - c. Abrasions
 - d. Punctures/penetrations
 - e. Burns
 - f. Tenderness
 - g. Lacerations
 - h. Swelling
 - i. Distal pulses
 - j. Sensation
 - k. Motor function
- 13. Roll with spinal precautions and assess posterior aspect of body, inspect and palpate for injuries or signs of injury.
 - a. Deformities
 - b. Contusions
 - c. Abrasions
 - d. Punctures/penetrations
 - e. Burns
 - f. Tenderness
 - g. Lacerations
 - h. Swelling

II. Assess Baseline Vital Signs.

MODULE 3

Patient Assessment

Lesson 3-6

On-Going Assessment

Declarative (What)

- I. Repeat initial assessment. For a stable patient, repeat and record every 15 minutes. For an unstable patient, repeat and record at a minimum every 5 minutes.
 - A. Reassess mental status.
 - B. Maintain open airway.
 - C. Monitor breathing for rate and quality.
 - D. Reassess pulse for rate and quality.
 - E. Monitor skin color and temperature.
 - F. Re-establish patient priorities.
- II. Reassess and record vital signs.
- III. Repeat focused assessment regarding patient complaint or injuries.
- IV. Check interventions.
 - A. Assure adequacy of oxygen delivery/artificial ventilation.
 - B. Assure management of bleeding.

MODULE 3

Patient Assessment

Lesson 3-7

Communications

Declarative (What)

I. Communication

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. In some systems, medical direction is at the receiving facility. In others, medical direction is at a separate site.
- b. In either case, EMT-Basics may need to contact medical direction for consultation and to get orders for administration of medications. Radio transmissions need to be organized, concise and pertinent.
- c. Since the physician will determine whether to order medications and procedures based on the information given by the EMT-Basic, this information must be accurate.
- d. After receiving an order for a medication or procedure (or denial of such a request), repeat the order back word for word.
- e. Orders that are unclear or appear to be inappropriate should be questioned.
- f. Communication with receiving facilities
- g. EMT-Basics provide information that allows hospitals to prepare for a patient's arrival by having the right room, equipment and personnel prepared.
- h. Patient reporting concepts
 - (1) When speaking on the radio, keep these principles in mind:
 - (a) 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) where the transmission is originating from.
- (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.
- (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. EMS transmissions may be overheard by more than just the EMS community. Do not give a patient's name over the air.
- (o) For the same reason, be careful to remain objective and impartial in describing patients. An EMT-Basic may be sued for slander if he injures someone's reputation in this way.
- (p) An EMT-Basic rarely acts alone: Use "we" instead of "I."
- (q) Do not use profanity on the air. The FCC takes a dim view of such language and may impose substantial fines.
- (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 codes, especially those that are not standardized.
- (v) Avoid offering a diagnosis of the patient's problem.
- (w) Use EMS frequencies only for EMS communication.

- (x) Reduce background noise as much as possible by closing the window.
 - (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, in the order they should be given, are:
 - (a) Identify unit and level of provider (who and what)
 - (b) Estimated time of arrival
 - (c) Patient's age and sex
 - (d) Chief complaint
 - (e) Brief, pertinent history of the present illness
 - (f) Major past illnesses
 - (g) Mental status
 - (h) Baseline vital signs
 - (i) Pertinent findings of the physical exam
 - (j) Emergency medical care given
 - (k) Response to emergency medical care
 - (4) After giving this information, the EMT-Basic will continue to assess the patient. Additional vital signs may be taken and new information may become available, particularly on long transports. In some systems, this information should be relayed to the hospital (see local protocol). Information that must be transmitted includes deterioration in the patient's condition.
 - (5) Arrival at the hospital
 - (a) The dispatcher must be notified.
 - (b) In some systems, the hospital should also be notified.
 - (6) Leaving the hospital for the station - the dispatcher should be notified.
 - (7) Arrival at the station - the dispatcher should be notified.
4. 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 EMT-Basics 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.
- B. Verbal communication
- 1. After arrival at the hospital, give a verbal report to the staff.
 - a. Introduce the patient by name (if known).
 - b. Summarize the information given over the radio:
 - (1) Chief complaint
 - (2) History that was not given previously
 - (3) Additional treatment given en route
 - (4) Additional vital signs taken en route
 - c. Give additional information that was collected but not transmitted.
- C. Written communication - this is covered in the lesson on documentation.
- D. Interpersonal 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. Use language the patient can understand.
 5. Be aware of your own body language.
 6. Speak clearly, slowly and distinctly.
 7. Use the patient's proper name, either first or last, depending on the circumstances. Ask the patient what he wishes to be called.
 8. If a patient has difficulty hearing, speak clearly with lips visible.
 9. Allow the patient enough time to answer a question before asking the next one.
 10. Act and speak in a calm, confident manner.
- E. Communication with hearing impaired, non-English speaking populations, use of interpreters, etc.
- F. Communication with elderly
1. Potential for visual deficit

MODULE 3

Patient Assessment

Lesson 3-8

Documentation

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. Level of consciousness (AVPU) - mental status
 - c. Systolic blood pressure for patients greater than 3 years old
 - d. Skin perfusion (capillary refill) for patients less than 6 years old
 - e. Skin color and temperature
 - f. Pulse rate
 - g. Respiratory rate and effort
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 clipboard or a similar device.
 - b. Sections
 - (1) Run data - date, times, service, unit, names of crew
 - (2) Patient data - patient name, address, date of birth, insurance information, sex, age, nature of call, mechanism of injury,

location of patient, treatment administered prior to arrival of EMT-Basic, signs and symptoms, care administered, baseline vital signs, SAMPLE history 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. If you do not know how to spell it, find out or use another word.
 - (i) For every reassessment, record time and findings.
- (5) Other state or local requirements

- c. Confidentiality - the form itself and the information on the form are considered confidential. Be familiar with state laws.
- 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, the EMT-Basic should not try to cover it up. Instead, document what did or did not happen and what steps were taken (if any) to correct the situation.
- b. Falsification of information on the prehospital care report may lead not only to suspension or revocation of the EMT-Basic'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-Basic 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, 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. 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 patient assessment.
 - (2) Care EMT-Basic wished to provide for the patient.
 - (3) Statement that the EMT-Basic explained to the patient the possible consequences of failure to accept care, including potential death.
 - (4) Offer alternative methods of gaining care.
 - (5) 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-Basic's initials.
 2. Multiple casualty incidents (MCI)
 - a. When there is not enough time to complete the form before the next call, the EMT-Basic 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.
 - c. Should be accurate and objective.
 - d. The EMT-Basic should keep a copy for his own records.
 - 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.

MODULE 4

Medical/Behavioral and Obstetrics/Gynecology

Lesson 4-1

General Pharmacology

Declarative (What)

- I. Overview - the importance of medications and the dangers associated with their administration.
- II. Medications (carried on the EMS unit)
 - A. Activated Charcoal - learned as a part of the poison/overdose module (4-6).
 - B. Oral Glucose - learned as a part of the diabetes module (4-4).
 - C. Oxygen (refer to airway module).
- III. Medications (prescribed by a physician and the patient has them in his possession; they are not carried on the EMS unit. May assist patients in taking, with approval by medical direction).
 - A. Prescribed Inhaler - learned as a part of the respiratory module (4-2).
 - B. Nitroglycerin - learned as a part of the cardiac module (4-3).
 - C. Epinephrine - learned as a part of the allergies module (4-5).
- IV. Medication names
 - A. Generic
 1. The name listed in the U.S. Pharmacopia, a governmental publication listing all drugs in the U.S.
 2. Name assigned to drug before it becomes officially listed. Usually a simple form of the chemical name.
 3. Give examples.
 - B. Trade
 1. Brand name is the name a manufacturer uses in marketing the drug.
 2. Give examples.
- V. Indications - the indication for a drug's use includes the most common uses of the drug in treating a specific illness.
- VI. Contraindications - situations in which a drug should not be used because it may cause harm to the patient or offer no effect in improving the patient's condition or illness.
- VII. Medication Form
 - A. Medications the EMT-Basic carries on the unit or medications that a patient may have a prescription for that the EMT-Basic may assist with administration.
 1. Compressed powders or tablets - nitroglycerin
 2. Liquids for injection - epinephrine
 3. Gels - glucose
 4. Suspensions - activated charcoal
 5. Fine powder for inhalation - prescribed inhaler
 6. Gases - oxygen
 7. Sub-lingual spray - nitroglycerin
 8. Liquid/vaporized fixed dose nebulizers
 - B. Each drug is in a specific medication form to allow properly controlled concentrations of the drug to enter into the blood stream where it has an effect on the target body system.
- VIII. Dose - state how much of the drug should be given.
- IX. Administration - state route by which the medication is administered such as oral, sublingual (under the tongue), injectable, or intramuscular.
- XI. Actions - state desired effects a drug has on the patient and/or his body systems.
- XII. Side Effects - state any actions of a drug other than those desired. Some side effects may be predictable.
- XIII. Re-assessment strategies
 - A. Repeat baseline vital signs.
 - B. Must be done as part of the on-going patient assessment.
 - C. Documentation of response to intervention.

MODULE 4

Medical/Behavioral and Obstetrics/Gynecology

Lesson 4-2

Respiratory Emergencies

I. Anatomy review

A. Respiratory

1. Nose and mouth
2. Pharynx
 - a. Oropharynx
 - b. Nasopharynx
3. Epiglottis - a leaf-shaped structure that prevents food and liquid from entering the trachea during swallowing.
4. Trachea (windpipe)
5. Cricoid cartilage - firm cartilage ring forming the lower portion of the larynx.
6. Larynx (voice box)
7. Bronchi - two major branches of the trachea to the lungs. Bronchus subdivides into smaller air passages ending at the alveoli.
8. Lungs
9. Diaphragm
 - a. Inhalation (active)
 - (1) Diaphragm and intercostal muscles contract, increasing the size of the thoracic cavity.
 - (a) Diaphragm moves slightly downward, flares lower portion of rib cage.
 - (b) Ribs move upward/outward.
 - (2) Air flows into the lungs.
 - b. Exhalation
 - (1) Diaphragm and intercostal muscles relax, decreasing the size of the thoracic cavity.
 - (a) Diaphragm moves upward.
 - (b) Ribs move downward/inward.
 - (2) Air flows out of the lungs.
10. Respiratory physiology
 - a. Alveolar/capillary exchange
 - (1) Oxygen-rich air enters the alveoli during each inspiration.
 - (2) Oxygen-poor blood in the capillaries passes into the alveoli.
 - (3) Oxygen enters the capillaries as carbon dioxide enters the alveoli.
 - b. Capillary/cellular exchange
 - (1) Cells give up carbon dioxide to the capillaries.
 - (2) Capillaries give up oxygen to the cells.
 - c. Adequate breathing
 - (1) Normal Rate
 - (a) Adult - 12-20/minute
 - (b) Child - 15-30/minute
 - (c) Infant - 25-50/minute
 - (2) Rhythm
 - (a) Regular
 - (b) Irregular
 - (3) Quality
 - (a) Breath sounds - present and equal
 - (b) Chest expansion - adequate and equal
 - (c) Effort of breathing - use of accessory muscles - predominantly in infants and children

- (4) Depth (tidal volume) - adequate
- d. Inadequate breathing
 - (1) Rate - outside of normal ranges.
 - (2) Rhythm - irregular
 - (3) Quality
 - (a) Breath sounds - diminished or absent
 - (b) Chest expansion - unequal or inadequate
 - (c) Increased effort of breathing - use of accessory muscles - predominantly in infants and children
 - (4) Depth (tidal volume) - inadequate/shallow
 - (5) The skin may be pale or cyanotic (blue) and cool and clammy.
 - (6) There may be retractions above the clavicles, between the ribs and below the rib cage, especially in children.
 - (7) Nasal flaring may be present, especially in children.
 - (8) In infants, there may be "seesaw" breathing where the abdomen and chest move in opposite directions.
 - (9) Agonal breathing (occasional gasping breaths) may be seen just before death.

11. Infant and child anatomy considerations

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

B. Adequate and inadequate artificial ventilation

1. An EMT-Basic is adequately artificially ventilating a patient when:

- a. The chest rises and falls with each artificial ventilation.
- b. The rate is sufficient, approximately 12 per minute for adults and 20 times per minute for children and infants.
- c. Heart rate returns to normal with successful artificial ventilation.

2. Artificial ventilation is inadequate when:

- a. The chest does not rise and fall with artificial ventilation.
- b. The rate is too slow or too fast.
- c. Heart rate does not return to normal with artificial ventilation.

II. Breathing Difficulty

A. Signs and symptoms

- 1. Shortness of breath
- 2. Restlessness
- 3. Increased pulse rate
- 4. Increased breathing rate
- 5. Decreased breathing rate
- 6. Skin color changes
 - a. Cyanotic (blue-gray)

- b. Pale
 - c. Flushed (red)
- 7. Noisy breathing
 - a. Crowing
 - b. Audible wheezing
 - c. Gurgling
 - d. Snoring
 - e. Stridor
 - (1) A harsh sound heard during breathing
 - (2) Upper airway obstruction
- 8. Inability to speak due to breathing efforts.
- 9. Retractions - 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. Irregular breathing rhythm
- 14. Patient position
 - a. Tripod position
 - b. Sitting with feet dangling, leaning forward.
- 15. Unusual anatomy (barrel chest)
- III. Emergency Medical Care - Focused History and Physical Exam
 - A. Important questions to ask
 - 1. Onset
 - 2. Provocation
 - 3. Quality
 - 4. Radiation
 - 5. Severity
 - 6. Time
 - 7. Interventions
 - B. Breathing
 - 1. Complains of trouble breathing.
 - a. Apply oxygen if not already done.
 - b. Assess baseline vital signs.
 - 2. Has a prescribed inhaler available.
 - a. Consult medical direction.
 - b. Facilitate administration of inhaler
 - (1) Repeat as indicated.
 - (2) Continue focused assessment.
 - 3. Does not have prescribed inhaler - continue with focused assessment.
- IV. Relationship to Airway Management - should be prepared to intervene with appropriate oxygen administration and artificial ventilation support.
- V. Medications
 - a. Prescribed inhaler
 - 1. Medication name
 - a. Generic - albuterol, isoetharine, metaproteranol, etc.
 - b. Trade - Proventil, Ventolin, Bronkosol, Bronkometer, Alupent, Metaprel, etc.
 - 2. Indications - meets all of the following criteria:
 - a. Exhibits signs and symptoms of respiratory emergency,
 - b. Has physician prescribed handheld inhaler, and
 - c. Specific authorization by medical direction.

3. Contraindications
 - a. Inability of patient to use device.
 - b. Inhaler is not prescribed for the patient.
 - c. No permission from medical direction.
 - d. Patient has already met maximum prescribed dose prior to EMT-Basic arrival.
4. Medication form - handheld metered dose inhaler
5. Dosage - number of inhalations based upon medical direction's order or physician's order based upon consultation with the patient.
6. Administration
 - a. Obtain order from medical direction either on-line or off-line.
 - b. Assure right medication, right patient, right route, patient alert enough to use inhaler.
 - c. Check the expiration date of the inhaler.
 - d. Check to see if the patient has already taken any doses.
 - e. Assure the inhaler is at room temperature or warmer.
 - f. Shake the inhaler vigorously several times.
 - g. Remove oxygen adjunct from patient.
 - h. Have the patient exhale deeply.
 - i. Have the patient put his lips around the opening of the inhaler.
 - j. Have the patient depress the handheld inhaler as he begins to inhale deeply.
 - k. Instruct the patient to hold his breath for as long as he comfortably can (so medication can be absorbed).
 - l. Replace oxygen on patient.
 - m. Allow patient to breathe a few times and repeat second dose per medical direction.
 - n. If patient has a spacer device for use with his inhaler, it should be used. A spacer device is an attachment between inhaler and patient that allows for more effective use of medication.
7. Actions - Beta agonist bronchodilators - dilates bronchioles reducing airway resistance.
8. Side effects
 - a. Increased pulse rate
 - b. Tremors
 - c. Nervousness
9. Re-assessment strategies
 - a. Gather vital signs and focused reassessment.
 - b. Patient may deteriorate and need positive pressure artificial ventilation.
10. Infant and child considerations
 - a. Use of handheld inhalers is very common in children.
 - b. Retractions are more commonly seen in children than adults.
 - c. Cyanosis (blue-gray) is a late finding in children.
 - d. Very frequent coughing may be present rather than wheezing in some children.
 - e. Emergency care with usage of handheld inhalers is the same if the indications for usage of inhalers are met by the ill child.

MODULE 4

Medical/Behavioral and Obstetrics/Gynecology

Lesson 4-3

Cardiac Emergencies

Declarative (What)

I. Review of 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

(1) Heart is more than a muscle.

(2) Specialized contractile and conductive tissue in the heart

(3) Electrical impulses

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 (sphygmomanometer) 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) Venae Cavae
 - (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**
 - (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.
- B. **Inadequate circulation - Shock (hypoperfusion):** A state of profound depression of the vital processes of the body. Characterized by signs and symptoms such as: Pale, cyanotic, cool clammy skin, rapid but weak pulse, rapid and shallow breathing, restlessness, anxiety or mental dullness, nausea and vomiting,

reduction in total blood volume, low or decreasing blood pressure and subnormal temperature.

- II. Cardiac Compromise - Signs and Symptoms. May include one or all of the following:
 - A. Squeezing, dull pressure, chest pain commonly radiating down the arms or to the jaw.
 - B. Sudden onset of sweating (this in and of itself is a significant finding).
 - C. Difficulty breathing (dyspnea)
 - D. Anxiety, irritability
 - E. Feeling of impending doom
 - F. Abnormal pulse rate (may be irregular)
 - G. Abnormal blood pressure
 - H. Epigastric pain
 - I. Nausea/vomiting

III. Specific Cardiovascular Conditions

- A. Congestive Heart Failure
 - 1. Caused by inadequate cardiac output. Many causes of this. Blood flow through the lungs and body is reduced. This results in edema or swelling. The body tries to compensate by increasing the blood pressure, heart rate, and breathing.
 - 2. Signs and symptoms:
 - a. Shortness of breath with wet lung sounds
 - (1) Pink frothy sputum is sometimes seen
 - b. Peripheral edema
 - c. Initial hypertension followed by hypotension
 - d. Heart rate may be fast or slow.
 - e. JVD
 - f. Diaphoresis
 - g. May have history of heart disease
 - h. Cyanosis
 - 3. Management at the EMT-B level is mainly supportive.
 - a. High flow oxygen via NRB.
 - b. Assisted ventilation may be needed. Attempt to maintain higher airway pressures when ventilating this patient.
 - c. The FROPVD is ideal for the CHF patient.
 - d. Place the patient in Fowler's position.
 - (1) This patient will not lie flat.
 - (2) If possible, let the legs dangle off of the cot.
 - e. Consider assisting the patient with nitroglycerin as directed by on-line medical command.
- B. Cerebrovascular Accident (Stroke)
 - 1. A stroke is the interruption of blood supply to a portion of the brain. This causes the brain to not work properly in the affected area. There are many causes of stroke and some are treatable if the patient is transported to an appropriate facility within 3 hours of the onset of symptoms. The term "brain attack" is often used to convey the time sensitive nature of this condition.
 - 2. Signs and symptoms:
 - a. One-sided (hemispheric) CNS abnormalities are the hallmark sign of CVA. If the patient is displaying general (global) CNS disturbances, the diagnosis of stroke is less likely.
 - (1) Facial asymmetry with drooping of one side of the mouth

- (2) Paralysis of an arm and leg
 - (3) Sudden onset of unilateral weakness, numbness
 - b. Slurred speech or inability to speak.
 - c. The patient may not respond to verbal command but be purposeful to painful stimuli.
 - d. If unconscious, the patient may demonstrate abnormal posturing movements of decortication or decerebration.
 - e. Snoring respirations suggest upper airway obstruction due to the tongue falling back against the posterior oropharynx.
 - f. The presenting symptoms may be sudden clumsiness, inability to walk or speak, or nausea and vomiting.
 - g. Vision disturbances.
 - h. Headache may or may not be present.
3. Treatment:
- a. Determine the time of onset of symptoms. This information is critical and may be lost if not recorded by EMS personnel.
 - (1) Time of signs and symptoms onset is important as it may differ from the time that the patient called for help.
 - (2) Record this as a time, not time elapsed (17:45 rather than 30 minutes ago)
 - (3) A patient who awakes with stroke signs and symptoms has an undermined onset.
 - b. Assess the patient for stroke using the Cincinnati Prehospital Stroke Scale.. It evaluates three criteria; facial droop, arm drift, and speech. If the response to any of these criteria is abnormal, stroke is strongly suspected.
 - (1) Facial droop - have patient show teeth or smile.
 - (a) Normal - both sides of face move equally well.
 - (b) Abnormal - one side of face doesn't move as well as the other side.
 - (2) Arm drift - have patient close eyes and hold arms straight out.
 - (a) Normal - both arms move the same or don't move at all.
 - (b) Abnormal - one arm either doesn't move or one arm drifts compared to the other.
 - (3) Speech - have the patient say "you can't teach an old dog new tricks."
 - (a) Normal - patient uses correct words with no slurring.
 - (b) Abnormal - patient slurs words, uses inappropriate words , or is unable to speak.
 - c. All suspected stroke patients should be treated as a "load and go" priority.
 - (1) Do initial assessment of ABC's;
 - (2) Perform airway interventions as indicated;
 - (3) Assess the prehospital stroke scale, determine the onset of symptoms, make diagnosis of stroke;
 - (4) Properly package the patient;
 - (5) Load and go;
 - (6) Perform supportive care enroute to the hospital.
 - (7) No definitive treatment for stroke can be initiated in the field.
 - (8) Establishment of a secure airway, breathing and circulation, and properly packaging the patient are the only interventions that should be performed on scene.

C. Automatic Implantable Cardiac Defibrillators (AICD):

1. Some patients who have experienced sudden cardiac death have had a miniaturized defibrillator surgically implanted in their chest. This device recognizes life-threatening dysrhythmias and administers a shock. It will not harm a rescuer if it fires while they are touching the patient. Patients with this device will have a wallet card with instructions. An AICD may be noticed as a “lump” in the upper left chest similar to an implanted pacemaker.
2. If you respond to a patient with an AICD try to determine if it has fired and if so how many times.
3. Emergency care does not differ in this patient. Proceed as you would for any other patient.

IV. Emergency Medical Care - Initial Patient Assessment Review

A. Circulation - pulse absent

1. Medical patient >12 years old - CPR with AED
2. Medical patient < 12 years old or < 90 lbs. - CPR

B. Responsive patient with a known history - cardiac

1. Perform initial assessment.
2. Perform focused history and physical exam.
3. Place patient in position of comfort.
4. Cardiac
 - a. Complains of chest pain/discomfort.
 - (1) Apply oxygen if not already done.
 - (2) Assess baseline vital signs.
 - b. Important questions to ask.
 - (1) Onset
 - (2) Provocation
 - (3) Quality
 - (4) Radiation
 - (5) Severity
 - (6) Time
 - c. Has been prescribed nitroglycerin (NTG) and nitro is with the patient.
 - (1) Blood pressure greater than 100 systolic
 - (a) One dose, repeat in 3-5 minutes if no relief and authorized by medical direction up to a maximum of three doses.
 - (b) Reassess vital signs and chest pain after each dose.
 - (2) Blood pressure less than 100 systolic - continue with elements of focused assessment.
 - d. Does not have prescribed nitroglycerin (NTG) - continue with elements of focused assessment.
 - e. Transport promptly

V. Relationship to Basic Life Support

- A. Not all chest pain patients become cardiac arrest patients.
- B. One Rescuer CPR - rarely done by EMT-Basics while on duty, may be done while partner is preparing equipment, or en route to facility.
- C. Two Rescuer CPR - learning outcomes of a Professional Rescuer CPR Course must be enhanced during an EMT-Basic course.
 1. EMT-Basics must also learn:
 - a. Use of automated external defibrillation.
 - b. To request available ALS backup to continue the chain of survival (as developed by AHA) when appropriate.

- c. Use of bag-valve-mask devices with oxygen attached.
- d. Use of flow restricted, oxygen-powered ventilatory devices.
- e. Techniques of lifting and moving patients.
- f. Suctioning of airways.
- g. Use of airway adjuncts.
- h. Use of body substance isolation for infections when necessary.
- i. Interviewing bystanders/family to obtain facts related to arrest events.

VI. Automated External Defibrillation

- A. Importance of automated external defibrillation to the EMT-Basic.
 - 6. Fundamentals of early defibrillation - successful resuscitation of out-of-hospital arrest depends on a series of critical interventions known as the chain of survival.
 - a. Early access
 - b. Early CPR
 - c. Early defibrillation
 - d. Early ACLS
 - 7. Rationale for early defibrillation
 - a. Many EMS systems have demonstrated increased survival outcomes of cardiac arrest patients experiencing ventricular fibrillation.
 - b. This increased survival was after early defibrillation programs were implemented and when all of the links in the chain of survival were present.
- B. Overview of automated external defibrillators
 - 1. Types of automated external defibrillators
 - a. Fully automated - defibrillator operates without action by EMT-Basic, except to turn on power.
 - b. Semi-automated - defibrillator uses a computer voice synthesizer to advise EMT-Basic as to the steps to take based upon its analysis of the patient's cardiac rhythm.
 - 2. Analysis of cardiac rhythms
 - a. Defibrillator computer microprocessor evaluates the patient's rhythm and confirms the presence of a rhythm for which a shock is indicated.
 - b. Accuracy of devices in rhythm analysis has been high both in detecting rhythms needing shocks and rhythms that do not need shocks.
 - c. Analysis is dependent on properly charged defibrillator batteries.
 - 3. Inappropriate delivery of shocks
 - a. Human error
 - b. Mechanical error
 - 4. Ventricular tachycardia
 - a. Attach defibrillator to only unresponsive, pulseless, nonbreathing patients to avoid delivering inappropriate shocks.
 - b. Defibrillator advises shocks for ventricular tachycardia when the rate exceeds a certain value, for example, above 180 beats per minute.
 - 5. Interruption of CPR
 - a. No CPR performed at times shocks are delivered.
 - b. No person should be touching patient when rhythm is being analyzed and when shocks are delivered.

- c. Chest compressions and artificial ventilations are stopped when the rhythm is being analyzed and when shocks are delivered.
 - d. Defibrillation is more effective than CPR, so stopping CPR during process is more beneficial to patient outcome.
 - e. CPR may be stopped up to 90 seconds if three shocks are necessary.
 - f. Resume CPR only after up to the first three shocks are delivered.
- C. Advantages of automated external defibrillation
- 1. Initial training and continuing education
 - a. Easier to learn than CPR, however, must memorize treatment sequence.
 - b. EMS delivery system should have:
 - (1) Necessary links in chain of survival.
 - (2) Medical direction.
 - (3) EMS system with audit and/or quality improvement program in place.
 - (4) Mandatory continuing education with skill competency review for EMS providers.
 - c. Continuing competency skill review every three months for EMT-Basic.
 - 2. Speed of operation - first shock can be delivered within one minute of arrival at the patient's side.
 - 3. Remote defibrillation through adhesive pads.
 - a. Defibrillation is "hands-off"
 - b. Safer method
 - c. Better electrode placement
 - d. Has larger pad surface area
 - e. Provokes less anxiety in EMT-Basic
 - 4. Rhythm monitoring - option on some defibrillator models.
- D. Use of automated external defibrillators during resuscitation attempts.
- 1. Operational steps
 - a. Take infection control precautions - should be done en route to scene.
 - b. Arrive on scene and perform initial assessment.
 - c. Stop CPR if in progress.
 - d. Verify pulselessness and apnea.
 - e. Have partner resume CPR.
 - f. Attach device.
 - g. Turn on defibrillator power.
 - h. Begin narrative if machine has tape recorder.
 - i. Stop CPR.
 - j. Clear patient.
 - k. Initiate analysis of rhythm.
 - (1) Machine advises shock.
 - (a) Deliver shock.
 - (b) Re-analyze rhythm.
 - (c) If machine advises shock, deliver second shock.
 - (d) Re-analyze rhythm.
 - (e) If machine advises shock, deliver third shock.
 - (f) Check pulse.
 - i) If pulse, check breathing.

- a) If breathing adequately, give high concentration oxygen by nonrebreather mask and transport.
 - b) If not breathing adequately, artificially ventilate with high concentration oxygen and transport.
 - ii) If no pulse, resume CPR for one minute.
 - a) Repeat one cycle of up to three stacked shocks.
 - b) Transport.
- (2) If, after any rhythm analysis, the machine advises no shock, check pulse.
 - (a) If pulse, check breathing.
 - i) If breathing adequately, give high concentration oxygen by nonrebreather mask and transport.
 - ii) If not breathing adequately, artificially ventilate with high concentration oxygen and transport.
 - (b) If no pulse, resume CPR for one minute.
 - i) Repeat rhythm analysis.
 - a) If shock advised, deliver if necessary up to two sets of three stacked shocks separated by one minute of CPR.
 - b) If no shock advised and no pulse, resume CPR for one minute.
 - c) Analyze rhythm third time.
 - If shock advised, deliver, if needed, up to two sets of three stacked shocks separated by one minute of CPR.
 - If no shock advised, resume CPR and transport.

2. Standard operational procedures

- a. Assuming no on-scene ALS, the patient should be transported when one of the following occurs:
 - (1) The patient regains a pulse.
 - (2) Six shocks are delivered.
 - (3) The machine gives three consecutive messages (separated by one minute of CPR) that no shock is advised.
- b. One EMT-Basic operates defibrillator, one does CPR.
- c. Defibrillation comes first. Don't hook up oxygen or do anything that delays analysis of rhythm or defibrillation.
- d. EMT-Basic must be familiar with device used in operational EMS setting.
- e. All contact with patient must be avoided during analysis of rhythm.
- f. State "Clear the patient" before delivering shocks.

7. Pulse checks should not occur during rhythm analysis. Typically there will be no pulse check between stacked shocks 1 & 2 and stacked shocks 4 & 5.
 8. Coordination of ALS personnel or EMT-Paramedics when EMT-Basics are using automated external defibrillators.
 - a. EMS system design establishes protocols.
 - b. AED usage does not require ALS on scene.
 - c. ALS should be notified of arrest events as soon as possible.
 - d. Considerations for EMT-Basic transporting the patient or waiting for ALS to arrive on the scene to transport should be in local protocols established by medical direction.
 9. Safety considerations
 - a. Water - rain
 - b. Metal
 - E. Post resuscitation care
 1. After automated external defibrillation protocol is completed, patient may:
 - a. Have pulses.
 - b. Have no pulse with machine indicating "no shock indicated."
 - c. Have no pulse with machine indicating shock.
 2. If pulses return
 - a. See airway module.
 - b. See lifting and moving patients module.
 - c. Consider awaiting ALS backup if appropriate.
 - d. See transportation module.
 - e. Continue to keep defibrillator device on patient en route.
 - f. Perform focused assessment and reassessment en route.
 - F. Defibrillator maintenance
 1. Regular maintenance for defibrillators is necessary.
 2. Operators Shift Checklist for Automated Defibrillators must be accomplished on a daily basis by EMT-Basics.
 3. Defibrillator failure is most frequently related to improper device maintenance, commonly battery failure. EMT-Basics must assure proper battery maintenance and battery replacement schedules.
 - G. Training and sources of information - the American Heart Association publishes a variety of guidelines and additional information on automated external defibrillation.
 - H. Maintenance of skills - most systems permit a maximum of 90 days between practice drills to reassess competency in usage of AEDs.
 - I. Medical direction
 1. Successful completion of AED training in an EMT-Basic course does not permit usage of the device without approval by state laws/rules and local medical direction authority.
 2. Every event in which an AED is used must be reviewed by the medical director or his designated representative.
 3. Reviews of events using AEDs may be accomplished by:
 - a. Written report.
 - b. Review of voice-ECG tape recorders attached to AED's.
 - c. Solid-state memory modules and magnetic tape recordings stored in device.
 - J. Quality improvement - involves both individuals using AEDs and the EMS system in which the AEDs are used.
- VII. Medications

- A. Nitroglycerin
1. Medication name
 - a. Generic - nitroglycerin
 - b. Trade - Nitrostat
 2. Indications - must have all of the following criteria:
 - a. Exhibits signs and symptoms of chest pain,
 - b. Has physician prescribed sublingual tablets, and
 - c. Has specific authorization by medical direction.
 3. Contraindications
 - a. Hypotension or blood pressure below 100 mmHg systolic.
 - b. Head injury
 - c. Infants and children
 - d. Patient has already met maximum prescribed dose prior to EMT-Basic 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. Take blood pressure - above 100 mmHg systolic.
 - d. Contact medical control if no standing orders.
 - 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 within 2 minutes.
 - k. Record activity and time.
 - l. Perform reassessment.
 7. Actions
 - a. Relaxes blood vessels
 - b. Decreases workload of heart
 8. Side effects
 - a. Hypotension
 - b. Headache
 - c. Pulse rate changes
 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.

MODULE 4

Medical/Behavioral and Obstetrics/Gynecology

Lesson 4-4

Diabetic Emergencies/Altered Mental Status

Declarative (What)

Signs and symptoms associated with a patient with altered mental status with a history of diabetes controlled by medication.

- A. Rapid onset of altered mental status.
 - 1. After missing a meal on a day the patient took prescribed insulin.
 - 2. After vomiting a meal on a day the patient took prescribed insulin.
 - 3. After an unusual exercise or physical work episode.
 - 4. May occur with no identifiable predisposing factor.
 - B. Intoxicated appearance, staggering, slurred speech to complete unresponsiveness
 - C. Elevated heart rate
 - D. Cold, clammy skin
 - E. Hunger
 - F. Seizures
 - G. Insulin in refrigerator or other medications found at scene.
 - 1. Diabinese
 - 2. Orinase
 - 3. Micronase
 - H. Uncharacteristic behavior
 - I. Anxious
 - J. Combative
- II. Seizures
- A. Seizures in children who have chronic seizures are rarely life-threatening. However, seizures, including febrile, should be considered life-threatening by the EMT.
 - B. May be brief or prolonged.
 - C. Caused by fever, infections, poisoning, hypoglycemia, trauma, decreased levels of oxygen or could be idiopathic in children.
 - D. Emergency medical care
 - 1. Assure patency of airway.
 - 2. Position patient on side if no possibility of cervical spine trauma.
 - 3. Have suction ready.
 - 4. If cyanotic, assure airway and artificially ventilate.
 - 5. 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.
 - E. Emergency medical care of an adult with altered mental status with a history of seizures.
 - 1. Seizures can be described as “short-circuits” or “thunderstorms” in the brain. They are uncoordinated, unnecessary electrical discharges in the brain. They may vary from full-body to only a particular area. There are many causes for seizures but, the most common is epilepsy. The primary concern at the EMT-B level is airway insufficiency during and after the seizure. Seizures can be dramatic. The rescuer must remain calm and focus on performing realistic interventions. After the seizure, the patient may have altered consciousness lasting several minutes. This is referred to as the “post-ictal” phase of the seizure.
 - 2. Assessment:
 - a) Perform initial assessment
 - b) Do focused medical history and assessment
 - (1) *Obtain a description of the seizure.*

- (2) *Determine the onset and duration.*
- (3) *Question bystanders whether the seizure was constant or intermittent.*
- (4) *The seizure patient may be incontinent of urine and feces.*
- (5) *Assess for injuries to the mouth and head from the seizure activity.*
- (6) *Snoring respirations and copious oral secretions are common in the post-ictal patient.*

3. Management:

- a) Protect the patient from further injury.
- b) Do not restrain the patient. Make the surrounding area safe.
- c) Provide for privacy.
- d) If the patient is actively seizing, consider inserting a nasopharyngeal airway and ventilating with a BVM.
 - (1) *It will be difficult to ventilate a seizing patient.*
 - (2) *Consider this intervention for the prolonged seizure.*
- e) Apply high-flow oxygen on the patient who is breathing adequately.
- f) Consider a nasopharyngeal airway for the snoring patient.
- g) Be prepared to suction the oropharynx.
- h) Control bleeding and dress any wounds.
- i) If the seizure lasts for more than 10 minutes, it is a dire medical emergency. Transport at once.

III. Altered Mental Status

A. Caused by a variety of conditions

- 1. Hypoglycemia
- 2. Poisoning
- 3. Post seizure
- 4. Infection
- 5. Head trauma
- 6. Decreased oxygen levels

B. Emergency medical care

- 1. Assure patency of airway.
- 2. Be prepared to artificially ventilate/suction.
- 3. Transport.
- 4. Consider trauma, trauma can cause altered mental status.

IV. Emergency medical care of altered mental status with a history of diabetes.

A. Perform initial assessment.

B. Perform focused history and physical exam.

- 1. Dissemination of the episode
- 2. Onset
- 3. Duration
- 4. Associated symptoms
- 5. Evidence of trauma
- 6. Interruptions
- 7. Seizures
- 8. Fever

C. Performs baseline vital signs and SAMPLE history.

D. Assure known history of diabetes (medical identification tags), etc.

E. Determine last meal, last medication dose, any related illness.

- F. Determine if patient can swallow.
- G. Administer oral glucose in accordance with local or state medical direction or protocol.

VI. Relationship to Airway Management

VI Medication

- A. Oral Glucose
 - 1. Medication Name
 - a. Generic - Glucose, Oral
 - b. Trade - Glucose, Insta-glucose
 - 2. Indications - patients with altered mental status with a known history of diabetes controlled by medication.
 - 3. Contraindications
 - a. Unresponsive.
 - b. Unable to swallow.
 - 4. Medication form - Gel, in toothpaste type tubes
 - 5. Dosage - one tube
 - 6. Administration
 - a. Obtain order from medical direction either on-line or off-line.
 - b. Assure signs and symptoms of altered mental status with a known history of diabetes.
 - c. Assure patient is conscious and can swallow and protect their airway.
 - d. Administer glucose.
 - (1) Between cheek and gum.
 - (2) Place on tongue depressor between cheek and gum.
 - e. Perform ongoing assessment.
 - 7. Actions - increases blood sugar
 - 8. Side effects - none when given properly. May be aspirated by the patient without a gag reflex.
 - 9. Re-assessment strategies - if patient loses consciousness or seizes, remove tongue depressor from mouth.

**Medical/Behavioral
and
Obstetrics/Gynecology**

Lesson 4-5

Allergies

Declarative (What)

- I. Allergic Reactions
 - A. Definition - an exaggerated immune response to any substance.
 - B. Possible causes
 1. Insect bites/stings - bees, wasps, etc.
 2. Food - nuts, crustaceans, peanuts, etc.
 3. Plants
 4. Medications
 5. Others
 - C. Assessment findings may include:
 1. Skin
 - a. Patient may state he has a warm tingling feeling in the face, mouth, chest, feet and hands.
 - b. Itching
 - c. Hives
 - d. Red skin (flushing)
 - e. Swelling to face, neck, hands, feet and/or tongue
 2. Respiratory system
 - a. Patient may state he feels a tightness in his throat/chest.
 - b. Cough
 - c. Rapid breathing
 - d. Labored breathing
 - e. Noisy breathing
 - f. Hoarseness (losing the voice)
 - g. Stridor
 - h. Wheezing (audible without stethoscope)
 3. Cardiac
 - a. Increased heart rate
 - b. Decreased blood pressure
 4. Generalized findings
 - a. Itchy, watery eyes
 - b. Headache
 - c. Sense of impending doom
 - d. Runny nose
 5. Decreasing mental status

6. Assessment findings that reveal shock (hypoperfusion) or respiratory distress indicate the presence of a severe allergic reaction.
- D. Emergency medical care of allergic reactions.
1. Patient has come in contact with substance that caused past allergic reaction and complains of respiratory distress or exhibits signs and symptoms of shock (hypoperfusion).
 - a. Perform initial assessment.
 - b. Perform focused history and physical exam.
 - (1) History of allergies.
 - (2) What was patient exposed to.
 - (3) How were they exposed.
 - (4) What effects.
 - (5) Progression.
 - (6) Interventions.
 - c. Assess baseline vital signs and SAMPLE history.
 - d. Administer oxygen if not already done in the initial assessment.
 - e. Determine if patient has prescribed preloaded epinephrine available. Facilitate administration of preloaded epinephrine.
 - f. Contact medical direction.
 - g. Record and reassess in two minutes.
 - h. Record reassessment findings.
 - i. If patient does not have epinephrine auto-injector available - transport immediately.
 2. Patient has contact with substance that causes allergic reaction without signs of respiratory distress or shock (hypoperfusion).
 - a. Continue with focused assessment.
 - b. Patient not wheezing or without signs of respiratory compromise or hypotension should not receive epinephrine.
- II. Relationship to Airway Management
- A. These patients may initially present with airway/respiratory compromise or airway/respiratory compromise may develop as the allergic reaction progresses.
 - B. The airway should be managed according to the principles identified in the airway management lesson presented earlier.

III. Medications

A. Epinephrine auto-injector

1. Medication name
 - a. Generic - Epinephrine
 - b. Trade - Adrenalin[®]
2. Indications - must meet the following three criteria:
 - a. Emergency medical care for the treatment of the patient exhibiting the assessment findings of an allergic reaction.
 - b. Medication is prescribed for this patient by a physician.
 - c. Medical direction authorizes use for this patient.
3. Contraindications - no contraindications when used in a life-threatening situation.
4. Medication form - liquid administered via an automatically injectable needle and syringe system.
5. Dosage
 - a. Adult - one adult auto-injector (0.3 mg)
 - b. Infant and child - one infant/child auto-injector (0.15 mg)
6. Administration
 - a. Obtain order from medical direction either on-line or off-line.
 - b. Obtain patient's prescribed auto-injector. Ensure:
 - (1) Prescription is written for the patient experiencing allergic reactions.
 - (2) Medication is not discolored (if able to see).
 - c. Remove safety cap from the auto-injector.
 - d. Place tip of auto-injector against the patient's thigh.
 - (1) Lateral portion of the thigh.
 - (2) Midway between the waist and the knee.
 - e. Push the injector firmly against the thigh until the injector activates.
 - f. Hold the injector in place until the medication is injected.
 - g. Record activity and time.
 - h. Dispose of injector in biohazard container.
7. Actions
 - a. Dilates the bronchioles.
 - b. Constricts blood vessels.
8. Side effects
 - a. Increases heart rate
 - b. Pallor
 - c. Dizziness
 - d. Chest pain
 - e. Headache
 - f. Nausea
 - g. Vomiting
 - h. Excitability, anxiousness
9. Re-assessment strategies
 - a. Transport.
 - b. Continue focused assessment of airway, breathing and circulatory status.
 - (1) Patient condition continues to worsen.
 - (a) Decreasing mental status
 - (b) Increasing breathing difficulty
 - (c) Decreasing blood pressure
 - (d) Obtain medical direction
 - i) Additional dose of epinephrine.
 - ii) Treat for shock (hypoperfusion).

- iii) Prepare to initiate Basic Cardiac Life support measures.
 - CPR
 - AED
- (2) Patient condition improves. Provide supportive care.
 - (a) Oxygen
 - (b) Treat for shock (hypoperfusion).

MODULE 4

Medical/Behavioral and Obstetrics/Gynecology

Lesson 4-6

Poisoning/Overdose

Declarative (What)

- I. Emergency Medical Care of Poisoning/Overdose
 - A. Important questions to consider asking patient
 1. What substance
 2. When did you ingest/become exposed
 3. If an ingestion, how much did you ingest
 4. Over what time period
 5. Interventions
 6. How much do you weigh
 - B. Ingested
 1. Signs and symptoms
 - a. History of ingestion
 - b. Nausea
 - c. Vomiting
 - d. Diarrhea
 - e. Altered mental status
 - f. Abdominal pain
 - g. Chemical burns around the mouth
 - h. Different breath odors
 2. Emergency medical care
 - a. Remove pills, tablets or fragments with gloves from patient's mouth, as needed, without injuring oneself.
 - b. Consult medical direction - activated charcoal.
 - c. Bring all containers, bottles, labels, etc. of poison agents to receiving facility.
 3. Alcohol
 - a. Alcohol is a commonly abused drug that has many harmful effects on the body. Alcoholism is prevalent in AK. It has a diuretic effect and causes vasodilation.
 - a. At low doses alcohol decreases inhibition and may serve as a stimulant.
 - b. Moderate doses will cause poor judgement, and impairs the thought process. Reflexes are slowed. Alcohol acts as a depressant.
 - c. High doses cause slurred speech, altered consciousness, and ataxia.Alcohol is a major contributing factor to trauma deaths.
 - C. Inhaled
 1. Signs and symptoms
 - a. History of inhalation of toxic substance
 - b. Difficulty breathing
 - c. Chest pain
 - d. Cough
 - e. Hoarseness
 - f. Dizziness
 - g. Headache
 - h. Confusion
 - i. Seizures
 - j. Altered mental status
 2. Emergency medical care
 - a. Have trained rescuers remove patient from poisonous environment.
 - b. Give oxygen, if not already done in the initial assessment.
 - c. Bring all containers, bottles, labels, etc. of poison agents to receiving facility.
 - D. Toxic injection
 1. Signs and symptoms

- a. Weakness
 - b. Dizziness
 - c. Chills
 - d. Fever
 - e. Nausea
 - f. Vomiting
 - 2. Emergency medical care
 - a. Airway and oxygen.
 - b. Be alert for vomiting.
 - c. Bring all containers, bottles, labels, etc. of poison agents to receiving facility.
- E. Absorbed
- 1. Signs and symptoms
 - a. History of exposure
 - b. Liquid or powder on patient's skin
 - c. Burns
 - d. Itching
 - e. Irritation
 - f. Redness
 - 2. Emergency medical care
 - a. Skin - remove contaminated clothing while protecting oneself from contamination.
 - (1) Powder - brush powder off patient, then continue as for other absorbed poisons.
 - (2) Liquid - irrigate with clean water for at least 20 minutes (and continue en route to facility if possible).
 - b. Eye - irrigate with clean water away from affected eye for at least 20 minutes and continue en route to facility if possible.

II. Relationship to Airway Management

- A. Use information and skills learned in airway section of course to manage airway difficulties.
- B. A patient's condition may deteriorate, so continue to assess patient for airway difficulties and manage as learned previously.

III. Medications

A. Activated charcoal

- 1. Medication name
 - a. Generic - Activated charcoal
 - b. Trade
 - (1) SuperChar
 - (2) InstaChar
 - (3) Actidose
 - (4) LiquiChar
 - (5) Others
- 2. Indications - poisoning by mouth
- 3. Contraindications
 - a. Altered mental status
 - b. Ingestion of acids or alkalis
 - c. Unable to swallow
- 4. Medication form
 - a. Pre-mixed in water, frequently available in plastic bottle containing 12.5 grams activated charcoal.
 - b. Powder - should be avoided in field.
- 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 direction either on-line or off-line.
 - b. Container must be shaken thoroughly.
 - c. Since medication looks like mud, patient may need to be persuaded to drink it.
 - d. A covered container and a straw may improve patient compliance since the patient cannot see the medication this way.
 - e. If patient takes a long time to drink the medication, the charcoal will settle and will need to be shaken or stirred again.
 - f. Record activity and time.
7. Actions
- a. Binds to certain poisons and prevents them from being absorbed into the body.
 - b. Not all brands of activated charcoal are the same; some bind much more poison than others, so consult medical direction about the brand to use.
8. Side effects
- a. Black stools
 - b. Some patients, particularly those who have ingested poisons that cause nausea, may vomit.
 - c. If the patient vomits, the dose should be repeated once.
9. Re-assessment strategies - the EMT-Basic should be prepared for the patient to vomit or further deteriorate.
- B. Syrup of Ipecac
1. Medication Name - Syrup of Ipecac
 2. Indication – ingested poisons
 3. Contraindications
 - a. Altered Mental Status
 - b. Ingestions of:
 - (1) acids
 - (2) bases
 - (3) petroleum products
 - (4) antiemetics (Compazine etc.)
 - c. Ingestion over 6 hours ago
 4. Medication Form – 30 ml liquid
 5. Dosage
 - a. Adult – 30 ml followed by several glasses of warm water
 - b. 1-12 years – 15 ml followed by glass of warm water
 - c. less than one year – 10 ml
 6. Administration
 - a. Obtain order from medical direction either on-line or off-line.
 - b. Have patient drink dose.
 - c. Do not mix ipecac with any other fluids.
 - d. Ipecac is very strong smelling and tasting. Some coaxing may be necessary.
 - e. Follow with water as recommended.
 - f. Do not give before or after Activated Charcoal, as it will be inactivated.
 7. Actions
 - a. Stimulates medulla in brain to cause vomiting.
 - b. Irritates GI tract.
 8. Side effects – rare

9. Reassessment strategies – the EMT should be prepared for the patient to vomit.

IV. Commonly Abused Drugs

- A. Alcohol
- B. Amphetamines
- C. Benzodiazepines
- D. Cocaine
- E. Hallucinogens
- F. Marijuana
- G. Narcotics
- H. Sedatives

MODULE 4

Medical/Behavioral and Obstetrics/Gynecology

Lesson 4-7

Environmental Emergencies

Declarative (What)

I. Temperature Regulation

A. Based on heat loss versus heat gained.

1. Heat loss exceeds heat gained - hypothermia (low body temperature)
 - a. Heat loss occurs by:
 - (1) Radiation
 - (2) Convection
 - (3) Conduction
 - (4) Evaporation
 - (5) Breathing
 - b. EMT-Basic must be aware of methods of heat loss when treating patients with hypothermia to prevent further heat loss.
2. Heat gained exceeds heat loss - hyperthermia (high body core temperature)

II. Important Questions to Ask Patients Exposed to the Environment

- A. Source
- B. Environment
- C. Loss of consciousness
- D. Effects
 1. General
 2. Local

II. Exposure to Cold-Refer to Most current version of the **Alaska Cold Injuries Guidelines**

III. Exposure to Heat

A. Predisposing factors

1. Climate
 - 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 and 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. Elderly
 - (1) Poor thermoregulation
 - (2) Medications
 - (3) Lack mobility - can not escape hot environment.
 - b. Newborn/infants
 - (1) Poor thermoregulation
 - (2) Cannot remove own clothing
4. Pre-existing illness and/or conditions
 - a. Heart disease
 - b. Dehydration
 - c. Obesity
 - d. Fever
 - e. Fatigue
 - f. Diabetes
5. Drugs/medications

B. Signs and symptoms

1. Muscular cramps
2. Weakness or exhaustion
3. Dizziness or faintness
4. Skin

- a. Moist, pale, normal to cool temperature
 - b. Hot, dry or moist - dire emergency
 - 5. Rapid heart rate
 - 6. Altered mental status to unresponsive
- C. Emergency medical care of heat emergencies - patient with normal mental status.
 - 1. Remove the patient from the hot environment and place in a cool environment (back of air conditioned ambulance).
 - 2. Administer oxygen if not already done during the initial assessment.
 - 3. Loosen or remove clothing.
 - 4. Cool patient by fanning.
 - 5. Put in supine position with legs elevated.
 - 6. If patient is responsive and is not nauseated, have the patient drink water.
 - 7. If the patient is unresponsive or is vomiting, transport to the hospital with patient on his left side.
- D. Emergency medical care of heat emergencies - patient with altered mental status.
 - 1. Remove the patient from the hot environment and place in a cool environment (back of air conditioned ambulance with air conditioner running on high).
 - 2. Remove clothing.
 - 3. Administer oxygen if not already done during the initial assessment.
 - 4. Apply cool packs to neck, groin and armpits.
 - 5. Keep the skin wet by applying water by sponge or wet towels.
 - 6. Fan aggressively.
 - 7. Transport immediately.

III. Water-Related Emergencies Refer to latest version of the **Alaska Cold Water Near Drowning Guidelines**

A. Near drowning/drowning

- 1. Ensure the safety of the rescue personnel.
- 2. Suspect possible spine injury if diving accident is involved or unknown.
- 3. Emergency medical care:
 - 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. Suction as needed.
 - d. Administer oxygen if not already done during the initial assessment.
 - e. For warm water drownings requiring resuscitation - see cardiac module.

IV. Bites and Stings

A. Signs and symptoms

- 1. History of bite (spider, snake) or sting (insect, scorpion, marine animal)
- 2. Pain
- 3. Redness
- 4. Swelling
- 5. Weakness
- 6. Dizziness
- 7. Chills
- 8. Fever
- 9. Nausea
- 10. Vomiting
- 11. Bite marks
- 12. Stinger

B. Emergency medical care

1. If stinger present, remove it.
 - a. Scrape stinger out; e.g., with edge of card.
 - b. Avoid using tweezers or forceps as these can squeeze venom from the venom sac into the wound.
2. Wash area gently.
3. Remove jewelry from injured area before swelling begins, if possible.
4. Place injection site slightly below the level of the patient's heart.
5. Do not apply cold to snakebites.
6. Consult medical direction regarding constricting band for snakebite.
7. Observe for development of signs and symptoms of an allergic reaction; treat as needed.

MODULE 4

Medical/Behavioral and Obstetrics/Gynecology

Lesson 4-8

Behavioral Emergencies

Declarative (What)

I. Behavior

- A. Behavior - manner in which a person acts or performs; any or all activities of a person, including physical and mental activity
- B. Behavioral Emergency - a situation where the patient exhibits abnormal behavior within a given situation that is unacceptable or intolerable to the patient, family or community. This behavior can be due to extremes of emotion leading to violence or other inappropriate behavior or due to a psychological or physical condition such as lack of oxygen or low blood sugar in diabetes
- C. Behavioral vs Psychiatric Emergency - Remember the term *behavioral emergency* describes medical emergencies with behavioral components as well as mental health/ psychiatric emergencies.
- D. Magnitude of Common Behavioral Emergencies in Alaska - See student materials on alcohol/drug abuse, suicide, homicide, and assaults.

II. Behavioral Change

- A. General factors that may alter a patient's behavior - the number of factors which may alter a patient's behavior include situation stresses, medical illnesses, psychiatric problems and alcohol or drugs. Below is a list of common causes for behavior alteration.
 1. Low blood sugar
 2. Lack of oxygen
 3. Inadequate blood flow to the brain
 4. Head trauma
 5. Mind altering substances - e.g. alcohol withdrawal/toxicity; drug delirium
 6. Psychiatric Illness - e.g. resulting in psychotic thinking, depression or panic
 7. Excessive cold
 8. Excessive heat
 9. Drug/Medication Side Effects

III. Myths and Fears

- A. Three basic myths and fears
 1. Not doing the right thing
 2. Harm to responder or others
 3. Making the situation worse
- B. Realities
 1. Scene safety
 2. Getting the patient safely to qualified mental health personnel is most important
 3. Many things can be done to minimize the risks
 - a. active listening
 - b. show respect
 - c. take the situation seriously
 4. Understand there is no quick fix

IV. General Assessment and Management of Behavioral Emergencies

- A. Scene Size-up
 1. Scene Safety
 - a. Be certain the scene is safe; have an escape route in mind.
 - b. Be aware of potential injuries-patient, responder, family, bystanders; if patient is acting suspiciously; wait for police assistance.
 - c. Teamwork is important; one member can interview and the other remains vigilant.
 - d. General environment condition
 - e. Observe mood of individual (e.g. rage, elation, fear, anxiety, depression)
 - f. Assess for evidence of alcohol or drug use.

- B. Initial assessment
 1. Maintain alertness to danger; mood of patient, environmental conditions
 2. Isolate patient if necessary
 3. Determine life threatening medical conditions
 4. Rapid assessment of ABCs and interventions if required.
- C. Focused History and Physical Exam
 1. Interviewing techniques
 - a. Center questions on immediate problem.
 - b. Active listening
 - c. Limit interruptions.
 - d. Calm, reassuring tone of voice
 2. Determine if individual is a danger to self, others, or gravely disabled.
 3. Assess patient's mental status.
 - a. Appearance
 - b. Activity
 - c. Speech
 - d. Orientation for time, person, place, and event
 4. Ask about medication history. Are you taking them as prescribed? Last oral intake? Allergies?
 - a. Common medications used for treatment of psychiatric disorders
 1. Antipsychotics
 2. Anti-Anxiety
 3. Antidepressants
 5. Pertinent past history
 6. Events leading up to present problem.

V. Interpersonal communication-the initial contact is crucial because it sets the tone for the rest of the interaction

- A. Gain Rapport and Keep Rapport
 1. Identify yourself and let the person know you are there to help.
 2. Inform patient of what you are doing or going to do.
 3. Remember the patient is more frightened than you are.
 4. Avoid rushing the intervention.
 5. Show you are listening but rephrasing or repeating part of what is said.
 6. Acknowledge the patient's feelings.
 7. Appear calm, understanding, non-judgmental, and in control.
 8. Be aware that in a crisis situation there is emotional distress. The patient may be disorganized, distracted, and unable to understand or answer questions clearly. It is up to you to remain calm, patient, and rational.
 9. Do not belittle or threaten patients.
 10. Do not agree or disagree with disturbed thinking.
 11. Be reassuring.
 12. Avoid arguing with irrational patients.
 13. Suggest appropriate steps to take.
 14. Lower distressing stimuli.
 15. Avoid restraints unless necessary.
 16. Treat with respect.

VI. Assessment for Suicide Risk

- A. Depression - common characteristics
 1. Sad, tearful
 2. Thoughts of death or taking one's life

3. Sleeping too much or not enough
 4. Excessive fatigue
 5. Agitation
 6. Mood fluctuations
 7. Difficulty concentrating
 8. Loss of interest in former activities, including sex
 9. Change in personal appearance
 10. Feelings or worthlessness
- B. Most psychiatric disorders, including depression, are caused by a biochemical imbalance
1. They are not caused by poor parenting; mental retardation; weakness in personality.
- C. Suicidal gestures - the EMT-1 must recognize and intervene in self-destructive behavior before the patient commits the act of suicide. Factors that indicate very high risk include:
1. Previous suicide attempts
 2. Depressed or other mental illness
 3. Chronic alcohol abuse or present intoxication
 4. For Alaska, suicide is the second leading cause of death for age groups 15-24.
 5. Access to a highly lethal method (e.g. gun).
 6. Precipitating events such as loss of loved one, loss of job, injury, threat of arrest, prosecution, chronic or serious illness
 7. Resources such as family, friends, social, community, financial are limited or absent
 8. Social isolation
 9. Expressing a plan, including a method
 10. Suicide ideation (thoughts), threats; homicidal ideation
- D. Additional Factors for Adolescents
1. Suicide of family member or friend
 2. Trouble with the law
 3. School performance problems; likelihood of dropping out; e.g. dropped off team
 4. Serious family fights and conflicts
 5. Loss or death of friend/family member, or loss of an important relationship (boy/girlfriend)
 6. Pregnancy or fear of pregnancy
 7. Physical or sexual abuse
- E. Assessment findings
1. Patient is in an unsafe environment or with unsafe objects in hands.
 2. Displaying of self-destructive behavior during initial assessment or prior to emergency response.
 3. Important questions to be considered
 - a. How does the patient feel?
 - b. Determine suicidal tendencies
 - * Perform A.S.K. assessment
 1. Were you trying to hurt yourself?
 2. Have you been feeling like life is not worth living?
 3. Have you been feeling like killing yourself?
 - c. Suicidal and homicidal tendencies
 - (1). Determine lethality
 - a. Is there a plan; how specific is the plan; how lethal is the method?
 - b. Is there a medical problem?
 - c. Are alcohol or drugs involved?
 - d. What interventions are needed?
- F. Emergency medical care
1. Scene size-up, personal safety

2. Treat medical problems
3. Patient assessment/perform A.S.K
4. Calm the patient - do not leave patient alone.
5. Restrain if necessary. Consider need for law enforcement.
6. Transport
7. If overdose, bring medications or drugs found to medical facility

VII. Medical/Legal Considerations

- A. Consent to care - legal problems are greatly reduced when the patient consents to care.
- B. How to handle the patient who resists treatment
 1. To provide care against patient's will, you must show a reasonable belief the patient would harm self or others or is gravely disabled.
 2. If a threat to self or others, patient may be transported without his/her Consent after contacting medical direction or assessment by a mental health professional or police.
 3. Usually law enforcement is required.
 4. Document patient assessment findings and interactions.
 5. Know Title 11 criminal law on use of force (see student materials)
- C. Avoiding unreasonable force
 1. Reasonable force depends on what force was necessary to keep patient from injuring self or others.
 2. Reasonableness is determined by looking at all circumstances involved.
 - a. Patient's size and strength
 - b. Type of abnormal behavior
 - c. Sex of patient
 - d. Mental state of patient
 - e. Method of restraint
 3. Be aware that patients may cause unexpected and sudden injury to self or others even after they have calmed down for a period of time.
 4. Avoid acts or physical force that may cause injury to the patient.
 5. EMS personnel may use reasonable force to defend against an attack by patients.
- D. Police and medical direction involvement
 1. Seek medical direction when considering restraining a patient.
 2. Ask for police assistance if during scene size-up the patient appears or acts aggressive or combative.
- E. Protection against false accusations
 1. Documentation of abnormal behavior exhibited by the patient is very important.
 2. Have witnesses in attendance especially during transport, if possible.
 3. Have help, same sex attendants, and third party witnesses available to protect the EMT-I from any sexual misconduct accusations that may occur.

VIII. Assessment of Potential for Violence

- A. Scene size-up
 1. History - the EMT-1 should check with family and bystanders to determine if the patient has a known history of aggression or combativeness.
 2. Posture - stands or sits in a position that threatens self or others. May have fists clinched or lethal objects in hands.
 3. Vocal activity - is yelling or verbally threatens harm to self or others.
 4. Physical activity - AGITATED, moves toward caregiver, carries heavy or threatening objects; has quick irregular movements, muscles tense.

IX. Calming Behavioral Emergency Patients

A. Methods

1. Acknowledge that the person seems upset and restate that you are there to help.
2. Inform her/him of what you are doing.
3. Ask questions in a calm, reassuring voice.
4. If you are unsure of what to say, stay calm and listen to the patient
5. Maintain a comfortable distance.
6. Encourage the patient to state what is troubling her/him.
7. Do not make quick moves.
8. Respond honestly to patient's questions.
9. Do not threaten, challenge or argue with disturbed patients.
10. Tell the truth, do not lie to the patient.
11. Do not "play along" with visual or auditory disturbances of the patient.
12. Involve trusted family members or friends, as appropriate.
13. Be prepared to stay at the scene for a long time. Always remain with the patient.
14. Avoid unnecessary physical contact. Do not be afraid to call for additional help if needed.
15. Use good eye contact.

X. Restraining Patients

A. Restraint should be avoided unless patient is a danger to self and/or others AND DOES NOT WANT TO COOPERATE WITH TREATMENT (See Criminal Law 11 in student handouts). When using restraints have police present, if possible, and get approval from medical direction. If restraints must be used, do the following:

1. Be sure to have adequate help.
2. Plan your activities.
3. Use only the force necessary for restraint.
4. Estimate range of motion of patient's arms and legs and stay beyond range until ready.
5. Once decision has been made - act quickly.
6. Have one EMT-1 talk to patient throughout restraining.
7. Approach with four persons, one assigned to each limb at all times at the same time.
8. Secure limbs together with equipment approved by medical direction.
9. Turn patient face up or down on stretcher depending on situation; BE ALERT FOR POSITIONAL ASPHYXIA
10. Secure to stretcher with multiple straps.
11. Cover face with surgical mask if spitting on EMT-1.
12. Reassess circulation frequently.
13. Document indication for restraining patients and technique of restraint.
14. Avoid unnecessary force.

MODULE 4

Medical/Behavioral and Obstetrics/Gynecology

Lesson 4-9

Obstetrics/ Gynecology

Declarative (What)

- I. Reproductive anatomy and physiology
 - A. Fetus - developing unborn baby
 - B. Uterus - organ in which a fetus grows, responsible for labor and expulsion of infant.
 - C. Birth Canal - vagina and lower part of the uterus.
 - D. Placenta - fetal organ through which fetus exchanges nourishment and waste products during pregnancy.
 - E. Umbilical cord - cord which is an extension of the placenta through which fetus receives nourishment while in the uterus.
 - F. Amniotic sac (bag of water) - the sac that surrounds the fetus inside the uterus.
 - G. Vagina - lower part of the birth canal.
 - H. Perineum - skin area between vagina and anus, commonly torn during deliver.
 - I. Crowning - the bulging-out of the vagina which is opening as the fetus' head or presenting part presses against it.
 - J. "Bloody Show" - mucus and blood that may come out of the vagina as labor begins.
 - K. 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
 - L. Presenting Part - the part of the infant/fetus that comes first - usually the head.
 - M. Abortion - miscarriage - delivery of products of conception early in pregnancy.
- II. Contents of a childbirth delivery kit
 - A. Surgical scissors
 - 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
- III. Emergency Medical Care - Predelivery Emergencies
 - A. Miscarriage - Spontaneous abortion - emergency medical care
 1. Size up
 2. Initial assessment
 3. History and physical exam
 4. Assess baseline vitals
 5. Treatment based on signs and symptoms
 6. Apply external vaginal pads
 7. Bring fetal tissues to hospital
 8. Support mother
 - B. Preeclampsia and Eclampsia are defined as conditions of toxemia during pregnancy. The causes are not understood.
 1. Edema and high blood pressure typify preeclampsia. If left untreated it may progress to eclampsia. Treatment is supportive. High flow oxygen; transport on left side with dim lights.
 2. Supportive treatment. High flow oxygen; left side, ventilate as needed. Rapid transport is indicated.
 - C. Seizure during pregnancy - emergency medical care

1. Size up
2. Initial assessment
3. History and physical exam
4. Assess baseline vitals
5. Treatment based on signs and symptoms
6. Transport on left side

D. Vaginal bleeding - late pregnancy vaginal bleeding, with or without pain. Emergency medical care:

1. Size up
2. Initial assessment
3. History and physical exam
4. Assess baseline vitals
5. Treatment based on signs and symptoms
6. Apply external vaginal pads
7. Transport

E. Trauma - emergency medical care - same as other trauma patients

1. Size up
2. Initial assessment
3. History and physical exam
4. Assess baseline vitals
5. Treatment based on signs and symptoms
6. Transport on left side

III. Normal Delivery

A. Predelivery considerations

1. It is best to transport an expecting mother, unless delivery is expected within a few minutes based on assessment of:
 - a. Are you pregnant?
 - b. How long have you been pregnant?
 - c. Are there contractions or pain?
 - d. Any bleeding or discharge?
 - e. Is crowning occurring with contractions?
 - f. What is the frequency and duration of contractions?
 - g. Does she feel as if she is having a bowel movement with increasing pressure in the vaginal area?
 - h. Does she feel the need to push?
 - i. Rock hard abdomen?
2. Precautions
 - a. Use body substance isolation.
 - b. Do not touch vaginal areas except during delivery and when your partner is present.
 - c. Do not let the mother go to bathroom.
 - d. Do not hold mother's legs together.
 - e. Recognize your own limitations and transport even if delivery must occur during transport.
 - f. If delivery is eminent with crowning, contact medical direction for decision to commit to delivery on site. If delivery does not occur within 10 minutes, contact medical direction for permission to transport.

B. Delivery procedures

1. Apply gloves, mask, gown, eye protection for infection control precautions.
2. Have mother lie with knees drawn up and spread apart.
3. Elevate buttocks - with blankets or pillow.

4. Create sterile field around vaginal opening with sterile towels or paper barriers.
 5. When the infant's head appears during crowning, place fingers on bony part of skull (not fontanelle or face) and exert very gentle pressure to prevent explosive delivery. Use caution to avoid fontanelle.
 6. If the amniotic sac does not break, or has not broken, use a clamp to puncture the sac and push it away from the infant's head and mouth as they appear.
 7. As the infant's head is being born, determine if the umbilical cord is around the infant's neck; slip over the shoulder or clamp, cut and unwrap.
 8. After the infant's head is born, support the head, suction the mouth two or three times and the nostrils. Use caution to avoid contact with the back of the mouth.
 9. As the torso and full body are born, support the infant with both hands.
 10. As the feet are born, grasp the feet.
 11. Wipe blood and mucus from mouth and nose with sterile gauze, suction mouth and nose again.
 12. Wrap infant in a warm blanket and place on its side, head slightly lower than trunk.
 13. Keep infant level with vagina until the cord is cut.
 14. Assign partner to monitor infant and complete initial care of the newborn.
 15. Clamp, tie and cut umbilical cord (between the clamps) as pulsations cease approximately 4 fingers width from infant.
 16. Observe for delivery of placenta while preparing mother and infant for transport.
 17. When delivered, wrap placenta in towel and put in plastic bag; transport placenta to hospital with mother.
 18. Place sterile pad over vaginal opening, lower mother's legs, help her hold them together.
 19. Record time of delivery and transport mother, infant and placenta to hospital.
- C. Vaginal bleeding following delivery - up to 500 cc of blood loss is normal following delivery.
1. A 500 cc blood loss is well tolerated by the mother following delivery. The EMT-Basic must be aware of this loss so as not to cause undue psychological stress on himself or the new mother.
 2. With excessive blood loss, massage the uterus.
 - a. Hand with fingers fully extended.
 - b. Place on lower abdomen above pubis.
 - c. Massage (knead) over area.
 - d. Bleeding continues - check massage technique and transport immediately, providing oxygen and ongoing assessment.
 3. Regardless of estimated blood loss, if mother appears in shock (hypoperfusion), treat as such and transport prior to uterine massage. Massage en route.
- D. 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 - normal findings
 - 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.

- E. Resuscitation of the newborn follows the inverted pyramid (see Appendix K) - after assessment, if signs and symptoms require either cardiac or pulmonary resuscitation, do the following when appropriate:
1. Breathing effort - if shallow, slow or absent provide artificial ventilations:
 - a. 60/min
 - b. Reassess after 30 seconds.
 - c. If no improvement, continue artificial ventilations and reassessments.
 2. Heart rate
 - a. If less than 100 beats per minute provide artificial ventilations:
 - (1) 60/min
 - (2) Reassess after 30 seconds.
 - (3) If no improvement continue artificial ventilations and reassessments.
 - b. If less than 80 beats per minute and not responding to bag-valve-mask, start chest compressions.
 - c. If less than 60 beats per minute, start compressions and artificial ventilations.
 3. 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.

IV. Abnormal Deliveries

- A. 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.
1. Size up
 2. Initial assessment
 3. Mother should have high flow oxygen
 4. History and physical exam
 5. Assess baseline vitals
 6. Treatment based on signs and symptoms
 7. Position mother with head down or buttocks raised using gravity to lessen pressure in birth canal.
 8. Insert sterile gloved hand into vagina pushing the presenting part of the fetus away from the pulsating cord.
 9. Rapidly transport, keeping pressure on presenting part and monitoring pulsations in the cord.
- B. 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.
1. Newborn at great risk for delivery trauma, prolapse cord more common, transport immediately upon recognition of breech presentation.
 2. Delivery does not occur within 10 minutes.
 3. Emergency medical care
 - a. Immediate rapid transportation upon recognition.
 - b. Place mother on oxygen.
 - c. Place mother in head down position with pelvis elevated.
- C. Limb presentation - occurs when a limb of the infant protrudes from the birth canal. Is more commonly a foot when infant is in breech presentation.
1. Immediate rapid transportation upon recognition.
 2. Place mother on oxygen.
 3. Place mother in head down position with pelvis elevated.
- D. Multiple births
1. Be prepared for more than one resuscitation.
 2. Call for assistance.

- E. Meconium - amniotic fluid that is greenish or brownish-yellow rather than clear; an indication of possible fetal distress during labor.
 - 1. Do not stimulate before suctioning oropharynx.
 - 2. Suction.
 - 3. Maintain airway.
 - 4. Transport as soon as possible.
- F. Premature
 - 1. Always at risk for hypothermia.
 - 2. Usually requires resuscitation, should be done unless physically impossible.
- V. Gynecological emergencies
 - A. Vaginal bleeding
 - 1. Body substance isolation
 - 2. Airway
 - B. Trauma - external genitalia - treat as other bleeding soft tissue injuries; never pack vagina, provide oxygen and on-going patient assessment.
 - C. Alleged sexual assault - criminal assault situations require initial and on-going assessment/management and psychological care. Emergency medical care:
 - 1. Body substance isolation
 - 2. Airway
 - 3. Non-judgmental attitude during SAMPLE focused assessment.
 - 4. Crime scene protection.
 - 5. Examine genitalia only if profuse bleeding present.
 - 6. Use same sex EMT-Basics for care when possible.
 - 7. Discourage the patient to bathe, void, or clean wounds.
 - 8. Reporting requirements.

MODULE 5

Trauma

Lesson 5-1

Bleeding and Shock

Declarative (What)

I. Circulatory (Cardiovascular) System Review

A. Anatomy review

1. Heart
2. Arteries
3. Capillaries
4. Veins
5. Blood
6. Physiology
7. Perfusion

- a. Definition - circulation of blood through an organ structure.
- b. Perfusion delivers oxygen and other nutrients to the cells of all organ systems and the removes waste products.
- c. Hypoperfusion is the inadequate circulation of blood through an organ.

II. External Bleeding

A. Body substance isolation must be routinely taken to avoid skin and mucous membrane exposure to body fluids.

1. Eye protection
2. Gloves
3. Gown
4. Mask
5. Hand washing following each run.

B. Severity

1. The 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. (For example, a one year old only has 800cc of blood, therefore 150cc is a major blood loss).
2. The severity of blood loss must be based on the patient's signs and symptoms and the general impression of the amount of blood loss. If the patient exhibits signs and symptoms of shock (hypoperfusion), the bleeding is to be considered serious.
3. The natural response to bleeding is blood vessel contractions and clotting; however, a serious injury may prevent effective clotting from occurring.
4. Uncontrolled bleeding or significant blood loss leads to shock (hypoperfusion) and possibly death.

C. Types of bleeding

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.

D. Emergency medical care of external bleeding

1. Body substance isolation
2. Maintain airway/artificial ventilation.
3. Bleeding control
 - a. Apply finger tip pressure directly on the point of bleeding.
 - b. Elevation of a bleeding extremity may be used secondary to and in conjunction with direct pressure.
 - c. Large gaping wounds may require packing with sterile gauze and direct hand pressure if direct finger tip pressure fails to control bleeding.
 - d. If bleeding does not stop, remove dressing and assess for bleeding point to apply direct pressure. If diffuse bleeding is discovered, apply additional pressure.
 - e. Pressure points may be used in upper and lower extremities.
4. Methods to control external bleeding if direct pressure fails
 - a. Splints
 - (1) Reduction of motion of bone ends will reduce the amount and aggravation of tissue damage and bleeding associated with a fracture.
 - (2) Splinting may allow prompt control of bleeding associated with a fracture.
 - b. Pressure Splints
 - (1) The use of air pressure splints can help control severe bleeding associated with lacerations of soft tissue or when bleeding is associated with fractures.
 - (2) Pneumatic counterpressure devices (pneumatic antishock garment) can be used as an effective pressure splint to help control severe bleeding due to massive soft tissue injury to the lower extremities (leg compartments only) or traumatic pelvic hemorrhage (all compartments).
 - c. Tourniquet
 - (1) Use as a last resort to control bleeding of an amputated extremity when all other methods of bleeding control have failed.
 - (2) Application of a tourniquet can cause permanent damage to nerves, muscles and blood vessels resulting in the loss of an extremity.
 - (3) Procedures for applying a tourniquet:
 - (a) Use a bandage 4 inches wide and 6 to 8 layers deep.
 - (b) Wrap it around the extremity twice at a point proximal to the bleeding but as distal on the extremity as possible.
 - (c) Tie one knot in the bandage and place a stick or rod on top of the knot and tie the ends of the bandage over the stick in a square knot.
 - (d) Twist the stick until the bleeding stops.
 - (e) Once the bleeding has stopped, secure the stick or rod in position.
 - (f) Notify other emergency personnel who may care for the patient that a tourniquet has been applied.
 - (g) Document the use of a tourniquet and the time applied in the prehospital patient report.
 - (4) A continuously inflated blood pressure cuff may be used as a tourniquet until bleeding stops.
 - (5) Precautions with the use of a tourniquet:
 - (a) Use a wide bandage and secure tightly.

- (b) Never use wire, rope, a belt, or any other material that may cut into the skin and underlying tissue.
- (c) Do not remove or loosen the tourniquet once it is applied unless directed to do so by medical direction.
- (d) Leave the tourniquet in open view.
- (e) Do not apply a tourniquet directly over any joint, but as close to the injury as possible.

E. Special areas (bleeding from the 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. If the bleeding is the result of trauma, do not attempt to stop the blood flow. Collect the blood with a loose dressing, which may also limit exposure to sources of infection.
3. Emergency medical care for epistaxis (nosebleed):
 - a. Place the patient in a sitting position leaning forward.
 - b. Apply direct pressure by pinching the fleshy portion of the nostrils together.
 - c. Keep the patient calm and quiet.

III. Internal Bleeding

A. Severity

1. Internal bleeding can result in severe blood loss with resultant shock (hypoperfusion) and subsequent death.
2. Injured or damaged internal organs commonly lead to extensive bleeding that is concealed.
3. Painful, swollen, deformed extremities may also lead to serious internal blood loss.
4. Suspicion and severity of internal bleeding should be based on the mechanism of injury and clinical signs and symptoms.

B. Relationship to mechanism of injury

1. Blunt trauma
 - a. Falls
 - b. Motorcycle crashes
 - c. Pedestrian impacts
 - d. Automobile collisions
 - e. Blast injuries
 - f. Look for evidence of contusions, abrasions, deformity, impact marks, and swelling.
2. Penetrating trauma

C. Signs and symptoms of internal bleeding

1. Pain, tenderness, swelling or discoloration of suspected site of injury.
2. Bleeding from the mouth, rectum, or vagina, or other orifice.
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. Late signs and symptoms of hypovolemic shock (hypoperfusion)
 - a. Anxiety, restlessness, combativeness or altered mental status
 - 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 - infant and child patients only
- h. Dropping blood pressure (late sign)
- i. Dilated pupils that are sluggish to respond
- j. Nausea and vomiting

D. Emergency medical care

- 1. Body substance isolation
- 2. Maintain airway/artificial ventilation.
- 3. Administer oxygen if not already done during the initial assessment.
- 4. If bleeding is suspected in an extremity, control bleeding by direct pressure and application of a splint.
- 5. Immediate transport is critical for patient with signs and symptoms of shock (hypoperfusion).

IV. Shock (hypoperfusion syndrome)

A. Severity

- 1. Shock (hypoperfusion) results in inadequate perfusion of cells with oxygen and nutrients and inadequate removal of metabolic waste products.
- 2. Cell and organ malfunction and death can result from shock (hypoperfusion); therefore, prompt recognition and treatment is vital to patient survival.
- 3. Peripheral perfusion is drastically reduced due to the reduction in circulating blood volume.
- 4. Trauma patients develop shock (hypoperfusion) from the loss of blood from both internal and external sites. This type of shock (hypoperfusion) is referred to as hypovolemic or hemorrhagic shock.

B. Signs and symptoms of shock (hypoperfusion)

- 1. Mental states
 - a. Restlessness
 - b. Anxiety
 - c. Altered mental status
- 2. Peripheral perfusion
 - a. Delayed capillary refill greater than 2 seconds in normal ambient air temperature - infant and child patients only
 - b. Weak, thready or absent peripheral pulses
 - c. Pale, cool, clammy skin
- 3. Vital signs
 - a. Decreased blood pressure (late sign)
 - b. Increased pulse rate (early sign) - weak and thready
 - c. Increased breathing rate
 - (1) Shallow
 - (2) Labored
 - (3) Irregular
- 4. Other signs and symptoms
 - a. Dilated pupils
 - b. Marked thirst
 - c. Nausea and vomiting
 - d. Pallor with cyanosis to the lips

5. Infant and child patients can maintain their blood pressure until their blood volume is more than half gone, so by the time their blood pressure drops they are close to death. The infant or child in shock has less reserve.

C. Emergency medical care

1. Body substance isolation.
2. Maintain airway/artificial ventilation. Administer oxygen if indicated.
3. Control any external bleeding.
4. If signs of shock (hypoperfusion) are present and the patients B/P is less than 90 mmHg with no evidence of chest injury or the lower abdomen is tender and pelvic injury is suspected, with no evidence of chest injury, apply and inflate the pneumatic antishock garment if approved by medical direction.
5. Elevate the lower extremities approximately 8 to 12 inches. If the patient has serious injuries to the pelvis, lower extremities, head, chest, abdomen, neck, or spine, keep the patient supine.
6. Splint any suspected bone or joint injuries.
7. Prevent loss of body heat by covering the patient with a blanket when appropriate.
8. Immediate transport.

MODULE 5

Trauma

Lesson 5-2

Soft Tissue Injuries

Declarative (What)

- I. Review the Skin
 - A. Function
 - B. Layers
- II. Injuries
 - A. Closed
 - 1. Types
 - a. Contusion (bruise)
 - (1) Epidermis remains intact
 - (2) Cells are damaged and blood vessels torn in the dermis
 - (3) Swelling and pain are typically present
 - (4) Blood accumulation causes discoloration
 - b. Hematoma
 - (1) Collection of blood beneath the skin
 - (2) Larger amount of tissue damage as compared to contusion
 - (3) Larger vessels are damaged
 - (4) May lose one or more liters of blood
 - c. Crush injuries
 - (1) Crushing force applied to the body
 - (2) Can cause internal organ rupture
 - (3) Internal bleeding may be severe with shock (hypoperfusion)
 - 2. Emergency medical care
 - a. Relationship to body substance isolation
 - (1) Gloves
 - (2) Hand washing
 - b. Proper airway/artificial ventilation/oxygenation
 - c. If shock (hypoperfusion) or internal bleeding is suspected - Treat for shock (hypoperfusion)
 - d. Splint a painful, swollen, deformed extremity.
 - e. Transport
 - B. Open
 - 1. Types
 - a. Abrasion
 - (1) Outermost layer of skin is damaged by shearing forces.
 - (2) Painful injury, even though superficial.
 - (3) No or very little oozing of blood.
 - b. Laceration
 - (1) Break in skin of varying depth
 - (2) May be linear (regular) or stellate (irregular) and occur in isolation or together with other types of soft tissue injury.
 - (3) Caused by forceful impact with sharp object.
 - (4) Bleeding may be severe.
 - c. Avulsion - flaps of skin or tissue are torn loose or pulled completely off.
 - d. Penetration/puncture
 - (1) Caused by sharp pointed object
 - (2) May be no external bleeding
 - (3) Internal bleeding may be severe
 - (4) Exit wound may be present
 - (5) Examples:
 - (a) Gun shot wound
 - (b) Stab wound

- e. Amputations
 - (1) Involves the extremities and other body parts
 - (2) Massive bleeding may be present or bleeding may be limited
- f. Crush injuries
 - (1) Damage to soft tissue and internal organs
 - (2) May cause painful, swollen, deformed extremities
 - (3) External bleeding may be minimal or absent
 - (4) Internal bleeding may be severe
- 2. Emergency medical care
 - a. Relationship to body substance isolation
 - (1) Gloves
 - (2) Gown
 - (3) Eye protection
 - (4) Hand washing
 - b. Maintain proper airway/artificial ventilation/oxygenation.
 - c. Management of open soft tissue injuries.
 - (1) Expose the wound.
 - (2) Control the bleeding.
 - (3) Prevent further contamination.
 - (4) Apply dry sterile dressing to the wound and bandage securely in place.
 - (5) Keep the patient calm and quiet.
 - (6) Treat for shock (hypoperfusion) if signs and symptoms are present.
 - d. Special considerations
 - (1) Chest injuries - occlusive dressing to open wound
 - (a) Administer oxygen if not already done
 - (b) Position of comfort if no spinal injury suspected
 - (c) Tension pneumothorax
 - i. Occurs when air within the thoracic cavity cannot exit the pleural space
 - ii. A true emergency that results in death if not immediately recognized and treated
 - iii. When air is allowed to leak into the pleural space during inspiration and becomes trapped during exhalation, an increase in pleural pressure results
 - a. The increase produces a shift in the mediastinum and further compresses the lung on the uninjured side
 - b. Venous return to the heart is decreased by compression of the vena cava, resulting in decreased cardiac output.
 - iv. Signs and symptoms
 - a. Anxiety
 - b. Cyanosis
 - c. Increasing dyspnea
 - d. Tracheal deviation (a late sign)
 - e. Tachycardia
 - f. Hypotension
 - g. diminished or absent breath sounds on the injured side
 - h. Distended neck veins (unless hypovolemic)

- i. Unequal expansion of the chest (tension does not fall with respiration)
- j. Subcutaneous emphysema
- v. Emergency care is directed at reducing the pressure in the pleural space
- vi. Tension pneumothorax associated with penetrating trauma
 - a. May occur when an open pneumothorax has been sealed with an occlusive dressing
 - b. Pressure may be relieved by momentarily removing the dressing (air escapes with an audible release of air)
 - c. After release of pressure, the wound should be resealed

(d) Pericardial tamponade

- i. Blunt or penetrating trauma may cause tears in the heart chamber walls, allowing blood to leak from the heart
- ii. Fluid in the pericardial space increases pericardial pressure and does not allow the heart to expand and refill with blood
 - a. Results in a decrease in stroke volume and cardiac output
- iii. Signs and symptoms
 - a. Most patients initially demonstrate peripheral vasoconstriction (which tends to raise diastolic pressure more than systolic pressure, causing a decrease in pulse pressure) and an increase in heart rate to compensate for the decrease in cardiac output
 - b. Muffled heart sounds
 - c. Jugular vein distention
 - d. Pulsus paradoxus may also occur, evidenced by a systolic blood pressure that drops more than 10-15 mm Hg during inspiration compared with expiration
- iv. Pericardial tamponade is a true emergency
- v. Prehospital care
 - a. Careful monitoring
 - b. Oxygen administration
 - c. Rapid transport

(2) Abdominal injuries -

- (a) Evisceration (organs protruding through the wound)
 - i. Do not touch or try to replace the exposed organ.
 - ii. Cover exposed organs and wound with a sterile dressing, moistened with sterile water or saline, and secure in place.
 - iii. Flex the patient's hips and knees, if uninjured.
- (b) Closed injury/blunt trauma
 - i. Manage ABCs as appropriate
 - ii. Treat Hypotension
 - iii. PASGs: The use of the pneumatic antishock garment in the patient with abdominal trauma is controversial. If the patient is hypotensive, consider the use of the PASG. If indicated by local protocol, inflate and maintain the patient's blood

pressure at the level specified in the protocols. Do not inflate the abdominal section if the patient has an evisceration.

- (3) Impaled objects
 - (a) Do not remove the impaled object, unless it is through the cheek, it would interfere with chest compressions, or interferes with transport.
 - (b) Manually secure the object.
 - (c) Expose the wound area.
 - (d) Control bleeding.
 - (e) Utilize a bulky dressing to help stabilize the object.
- (4) Amputations - concerns for re-attachment
 - (a) Wrap the amputated part in a sterile dressing.
 - (b) Wrap or bag the amputated part in plastic and keep cool.
 - (c) Transport the amputated part with the patient.
 - (d) Do not complete partial amputations.
 - (e) Immobilize to prevent further injury.
- (5) Large open neck injury
 - (a) May cause air embolism.
 - (b) Cover with an occlusive dressing.
 - (c) Compress carotid artery only if necessary to control bleeding.

C. Burns

1. Classification - according to depth
 - a. Superficial - involves only the epidermis
 - (1) Reddened skin
 - (2) Pain at the site
 - b. Partial thickness - involves both the epidermis and the dermis, but does not involve underlying tissue.
 - (1) Intense pain
 - (2) White to red skin that is moist and mottled
 - (3) Blisters
 - c. Full thickness - burn extend through all the dermal layers and may involve subcutaneous layers, muscle, bone or organs.
 - (1) Skin becomes dry and leathery and may appear white, dark brown or charred
 - (2) Loss of sensation - little or no pain, hard to the touch, pain at periphery
2. Severity
 - a. Depth or degree of the burn
 - (1) Superficial
 - (2) Partial thickness
 - (3) Full thickness
 - b. Percentage of body area burned - size of the patient's hand is equal to 1%.
 - (1) Rule of nines
 - (a) Adult
 - i) Head and neck - 9%
 - ii) Each upper extremity - 9%
 - iii) Anterior trunk - 18%
 - iv) Posterior trunk - 18%
 - v) Each lower extremity - 18%
 - vi) Genitalia - 1%
 - (b) Infant

- i) Head and neck - 18%
 - ii) Each upper extremity - 9%
 - iii) Anterior trunk - 18%
 - iv) Posterior trunk - 18%
 - v) Each lower extremity - 14%
 - c. Location of the burn
 - (1) Face and upper airway
 - (2) Hands
 - (3) Feet
 - (4) Genitalia
 - d. Pre-existing medical conditions
 - e. Age of the patient
 - (1) Less than five years of age
 - (2) Greater than fifty-five years of age
 - f. Determine severity
 - (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 the body surface
 - (d) Partial thickness burns covering more than 30% of the body surface area
 - (e) Burns complicated by painful, swollen, deformed extremity
 - (f) Moderate burns in young children or elderly patients
 - (g) Burns encompassing any body part e.g. arm, leg, or chest.
 - (2) Moderate burns
 - (a) Full thickness burns of 2 to 10% of the body surface area excluding hands, feet, face, genitalia and upper airway
 - (b) Partial thickness burns of 15 to 30% of the body surface area
 - (c) Superficial burns of greater than 50% body surface area
 - (3) Minor burns
 - (a) Full thickness burns of less than 2% of the body surface area
 - (b) Partial thickness burns of less than 15% of the body surface area
3. Emergency medical care
- a. Stop the burning process, initially with water or saline.
 - b. Remove smoldering clothing and jewelry.
 - c. Body substance isolation
 - d. Continually monitor the airway for evidence of closure.
 - e. Prevent further contamination.
 - f. Cover the burned area with a dry sterile dressing.
 - g. Do not use any type of ointment, lotion or antiseptic.
 - h. Do not break blisters.
 - i. Transport.
 - j. Know local protocols for transport to appropriate local facility.
4. Infant and child considerations
- a. Relative size
 - (1) Greater surface area in relationship to the total body size.
 - (2) Results in greater fluid and heat loss.

- (3) 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 a critical burn in a child.
 - (4) Any partial thickness burn of 10 to 20% is considered a moderate burn in a child.
 - (5) Any partial thickness burn less than 10% is considered a minor burn.
 - b. Higher risk for shock (hypoperfusion), airway problem or hypothermia.
 - c. Consider possibility of child abuse.
- 5. Chemical burns
 - a. Take the necessary scene safety precautions to protect yourself from exposure to hazardous materials.
 - b. Wear gloves and eye protection.
 - c. Emergency medical care
 - (1) Dry powders should be brushed off prior to flushing.
 - (2) Immediately begin to flush with large amounts of water.
 - (3) Continue flushing the contaminated area when en route to the receiving facility.
 - (4) Do not contaminate uninjured areas when flushing.
- 6. Electrical burns
 - a. Scene safety
 - (1) Do not attempt to remove patient from the electrical source unless trained to do so.
 - (2) If the patient is still in contact with the electrical source or you are unsure, do not touch the patient.
 - b. Emergency medical care
 - (1) Administer oxygen if indicated.
 - (2) Monitor the patient closely for respiratory and cardiac arrest (consider need for AED).
 - (3) Often more severe than external indications.
 - (4) Treat the soft tissue injuries associated with the burn. Look for both an entrance and exit wound.

III. Dressing and Bandaging

- A. Function
 - 1. Stop bleeding.
 - 2. Protect the wound from further damage.
 - 3. Prevent further contamination and infection.
- B. Dressings
 - 1. Universal dressing
 - 2. 4 X 4 inch 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

MODULE 5

Trauma

Lesson 5-3

Musculoskeletal Care

Declarative (What)

- I. Musculoskeletal Review
 - A. Anatomy review
 - B. The skeletal system
- II. 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. A fracture is a break in a bone
 - d. A dislocation is the displacement of the bone ends that form a joint
 2. Signs and symptoms
 - a. Deformity or angulation
 - b. Pain and tenderness
 - c. Grating
 - d. Swelling
 - e. Bruising (discoloration)
 - i. Exposed bone ends
 - j. Joint locked into position
 3. Emergency medical care of bone or joint injuries
 - a. Body substance isolation
 - b. Administer oxygen if not already done and indicated.
 - c. After life threats have been controlled, splint injuries in preparation for transport.
 - d. Application of cold pack to area of painful, swollen, deformed extremity to reduce swelling.
 - e. Elevate the extremity.
 4. Flail Chest
 - a. Occurs when 2 or more adjacent ribs are fractured in 2 or more places
 - b. Not usually detected in the prehospital setting because of the muscle spasm that accompanies the injury. Within 2 hours after the injury, the muscle spasm subsides and the injured segment of the chest wall may begin to move in a paradoxical fashion with inspiration and expiration.
 - c. Signs and symptoms include tenderness, bony crepitus on palpation, and paradoxical motion (a late sign).
 - d. Prehospital management includes
 - (1) Stabilize the flail segment with a bulky dressing and tape.
 - (2) If spinal immobilization permits, position the patient lying on the injured side
 - (3) Assist ventilation if needed with positive pressure oxygen.
- III. Splinting
 - A. Reasons
 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 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. General rules of splinting
1. Assess pulse, motor, and sensation distal to the injury prior to and following splint application and record findings.
 2. Immobilize the joint above and below the injury.
 3. Remove or cut away clothing.
 4. Cover open wounds with a sterile dressing.
 5. If there is a severe deformity or the distal extremity is cyanotic or lacks pulses, align with gentle traction before splinting.
 6. Do not intentionally replace the protruding bones.
 7. Pad each splint to prevent pressure and discomfort to the patient.
 8. Splint the patient before moving when feasible and no life threats.
 9. When in doubt, splint the injury when feasible and no life threats.
 10. If patient has signs of shock (hypoperfusion), align in normal anatomical position and transport (Total body immobilization. Example: Backboard takes care of all immobilization on emergency basis).
- C. Equipment
1. Rigid splints
 2. Traction splints
 3. Pneumatic splints (air, vacuum)
 4. Improvised splints, pillow
 5. Pneumatic Anti Shock Garment (as a splint)
- D. 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
- E. Special considerations of splinting
1. Long bone splinting procedure
 - a. Body substance isolation
 - b. Apply manual stabilization.
 - c. Assess pulse, motor and sensory function.
 - 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. Reassess pulse, motor, and sensation after application of splint and record.
 2. Splinting a joint injury
 - a. Body substance isolation
 - b. Apply manual stabilization.
 - c. Assess pulse, motor and sensory function.

- 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 pulse, motor and sensation after application of splint and record.
3. Traction splinting
- a. Indications for use is a painful, swollen, deformed mid-thigh 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) Assess pulse, motor, and sensation distal to the injury and record.
 - (2) Body substance isolation
 - (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 pulses, motor, sensation distal to the injury after application of the splint and record.
 - (13) Secure torso to the longboard to immobilize hip.
 - (14) Secure splint to the long board to prevent movement of splint.

MODULE 5

Trauma

Lesson 5-4

Injuries to the Head and Spine

Declarative (What)

- I. The Nervous System Review
 - A. Components
 - B. Actions
- II. The Skeletal System
 - A. Functions
 - B. Components
 - 1. Skull
 - 2. Spinal column
 - a. 33 bones
 - b. Surrounds and protects the spinal cord.
- III. 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. Unconscious trauma victims
 - B. Signs and symptoms
 - 1. 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.
 - 2. Tenderness in the area of injury
 - 3. Pain associated with moving
 - a. Do not ask the patient to move to try to elicit a pain response.
 - b. Do not move the patient to test for a pain response.
 - 4. Tell the patient not to move while asking questions.
 - 5. Pain independent of movement or palpation
 - a. Along spinal column
 - b. Lower legs
 - c. May be intermittent
 - 6. Obvious deformity of the spine upon palpation
 - 7. Soft tissue injuries associated with trauma
 - a. Head and neck to cervical spine
 - b. Shoulders, back or abdomen - thoracic, lumbar
 - c. Lower extremities - lumbar, sacral
 - 8. Numbness, weakness or tingling in the extremities
 - 9. Loss of sensation or paralysis below the suspected level of injury

10. Loss of sensation or paralysis in the upper or lower extremities
11. Incontinence
- C. Assessing the potential spine injured patient
 1. Responsive patient
 - a. Mechanism of injury
 - b. Questions to ask
 - (1) Does your neck or back hurt?
 - (2) What happened?
 - (3) Where does it hurt?
 - (4) Can you move your hands and feet?
 - (5) Can you feel me touching your fingers?
 - (6) Can you feel me touching your toes?
 - c. Inspect for contusions, deformities, lacerations, punctures, penetrations, swelling.
 - d. Palpate for areas of tenderness or deformity.
 - e. Assess equality of strength of extremities
 - (1) Hand grip
 - (2) Gently push feet against hands
 2. Unresponsive patient
 - a. Mechanism of injury
 - b. Initial assessment
 - c. Inspect for:
 - (1) Contusions
 - (2) Deformities
 - (3) Lacerations
 - (4) Punctures/penetrations
 - (5) Swelling
 - d. Palpate for areas of tenderness or deformity.
 - e. Obtain information from others at the scene to determine information relevant to mechanism of injury or patient mental status prior to the EMT-Basic's arrival.
- D. Complications
 1. Inadequate breathing effort
 2. Paralysis
- E. Emergency medical care
 1. Body substance isolation
 2. Establish and maintain in-line immobilization.
 - 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. Perform initial assessment.
 - a. Whenever possible, airway control must be done with in-line immobilization.
 - b. Whenever possible, artificial ventilation must be done with in-line immobilization.
 4. Assess pulse, motor and sensation in all extremities.
 5. Assess the cervical region and neck.
 6. Apply a rigid, cervical immobilization device.
 - a. Properly size the cervical immobilization device. If it doesn't fit use a rolled towel and tape to the board and have rescuer hold the head manually.

- b. An improperly fit immobilization device will do more harm than good.
- 7. If found in a lying position, immobilize the patient to a long spine board.
 - a. Position the device.
 - b. Move the patient onto the device by log rolling.
 - (1) One EMT-Basic must maintain in-line immobilization of the head and spine.
 - (2) EMT-Basic at the head directs the movement of the patient.
 - (3) One to three other EMT-Basics control the movement of the rest of the body.
 - (4) Quickly assess posterior body if not already done in focused history and physical exam.
 - (5) Position the long spine board under the patient.
 - (6) Place patient onto the board at the command of the EMT-Basic holding in-line immobilization using a slide, proper lift, log roll or scoop stretcher so as to limit movement to the minimum amount possible. Which method to use must be decided based upon the situation, scene and available resources.
 - (7) Pad voids between the patient and the board.
 - (a) Adult
 - i) Under the head
 - ii) Voids under torso. Be careful of extra movement.
 - (b) Infant and child - pad under the shoulders to the toes to establish a neutral position.
 - (8) Immobilize torso to the board.
 - (9) Immobilize the patient's head to the board.
 - (10) Secure the legs to the board.
 - (11) Reassess pulses, motor and sensation and record.
- 8. If the patient is found in a sitting position in a chair, immobilize with a short spine immobilization device. Exception: If the patient must be removed urgently because of his injuries, the need to gain access to others, or dangers at the scene, he must then be lowered directly onto a longboard and removed with manual immobilization provided.
 - a. Position device behind the patient.
 - b. Secure the device to the patient's torso.
 - c. Evaluate torso fixation and adjust as necessary without excessive movement of the patient.
 - d. Evaluate and pad behind the patient's head as necessary to maintain neutral in-line immobilization.
 - e. Secure the patient's head to the device.
 - f. Insert a longboard under the patient's buttocks and rotate and lower him to it. If not possible, lower him to the long spine board.
 - g. Reassess pulses, motor and sensory in all extremities and record.
- 9. If the patient is found in a standing position, immobilize the patient to a 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.
10. If the patient is critically injured, perform a rapid extrication.
11. Transport the patient immediately.
 - a. Bring body into alignment.
 - b. Transfer to long board without short spine board.

IV. Injuries to the Brain and Skull

A. Head injuries

1. Injuries to the scalp
 - a. Very vascular, may bleed more than expected.
 - b. Control bleeding with direct pressure.
2. Injury to the brain - injury of brain tissue or bleeding into the skull will cause an increase of pressure in the skull.

B. Related non-traumatic conditions

1. Non-traumatic injuries to the brain may occur due to clots or hemorrhaging.
2. Non-traumatic brain injuries can be a cause of altered mental status.
3. Signs and symptoms parallel that of traumatic injuries with the exception of evidence of trauma and a lack of mechanism of injury.

C. Skull injury - signs and symptoms

1. Mechanism of trauma
2. Contusions, lacerations, hematomas to the scalp
3. Deformity to the skull
4. Blood or fluid (cerebrospinal fluid) leakage from the ears or nose
5. Bruising (discoloration) around the eyes
6. Bruising (discoloration) behind the ears (mastoid process)

D. Head injury

1. Traumatic
2. Signs and symptoms
 - a. Altered or decreasing mental status is the best indicator of a brain injury.
 - (1) Confusion, disorientation, or repetitive questioning
 - (2) Conscious - deteriorating mental status
 - (3) Unresponsive
 - b. Irregular breathing pattern
 - c. Consideration of mechanism of injury
 - (1) Deformity of windowshield
 - (2) Deformity of helmet
 - d. Contusions, lacerations, hematomas to the scalp
 - e. Deformity to the skull
 - f. Blood or fluid (cerebrospinal fluid) leakage from the ears and nose
 - g. Bruising (discoloration) around the eyes
 - h. Bruising (discoloration) behind the ears (mastoid process)
 - i. Neurologic disability
 - j. Nausea and/or vomiting
 - k. Unequal pupil size with altered mental status
 - l. Seizure activity may be seen.

E. Open head injury

1. Signs and symptoms
 - a. Consideration of mechanism of injury
 - (1) Deformity of windowshield

(2) Deformity of helmet

- b. Contusions, lacerations, hematomas to the scalp
- c. Deformity to the skull
- d. Penetrating injury - do not remove impaled objects in the skull
- e. Soft area or depression upon palpation
- f. Exposed brain tissue if open
- g. Bleeding from the open bone injury
- h. Blood or fluid (cerebrospinal fluid) leakage from the ears and nose
- i. Bruising (discoloration) around the eyes
- j. Bruising (discoloration) behind the ears (mastoid process)
- k. Nausea and/or vomiting
- l. Possible signs and symptoms of a closed head injury may exist if brain injury has occurred.

F. Emergency medical care

- 1. Body substance isolation
 - 2. Maintain airway/artificial ventilation/oxygenation.
 - 3. Initial assessment with spinal immobilization should be done on scene with a complete detailed physical exam en route.
 - 4. With any head injury, the EMT-Basic must suspect spinal injury. Immobilize the spine.
 - 5. Closely monitor the airway, breathing, pulse, and mental status for deterioration.
 - 6. Control bleeding.
 - a. Do not apply pressure to an open or depressed skull injury.
 - b. Dress and bandage open wound as indicated in the treatment of soft tissue injuries.
 - 7. If a medical injury or non-traumatic injury exist, place patient on the left side.
 - 8. If the GCS is less than 8, and active seizures or one or more of the following signs of brain herniation are present, hyperventilate the patient with high concentration oxygen at a rate of 20 breaths/minute (for a child less than 8 years of age, the rate is 25 breaths/minute).
 - a. Fixed or asymmetric pupils
 - b. Abnormal flexion or abnormal extension(neurologic posturing)
 - c. Hypertension and bradycardia
 - d. Intermittent apnea
 - e. Further decrease in SCS of 2 or more points
- DO NOT HYPERVENTILATE UNLESS THE ABOVE CRITERIA ARE MET
- 9. Be prepared for changes in patient condition.
 - 10. Immediately transport the patient.

V. Immobilization

A. Cervical spine immobilization devices

- 1. Indications
 - a. Any suspected injury to the spine based on mechanism of injury, history or signs and symptoms.
 - b. Use in conjunction with short and long backboards.
- 2. Sizing
 - a. Various types of rigid cervical immobilization devices exist, therefore, sizing is based on the specific design of the device.
 - b. An improperly sized immobilization device has a potential for further injury.
 - c. Do not obstruct the airway with the placement of a cervical immobilization device.

- d. If it doesn't fit use a rolled towel and tape to the board and manually support the head. An improperly fit device will do more harm than good.
 - 3. **Precautions**
 - a. Cervical immobilization devices alone do not provide adequate in-line immobilization.
 - b. Manual immobilization must always be used with a cervical immobilization device until the head is secured to a board.
- B. **Short backboards**
 - 1. Several different types of short board immobilization devices exist.
 - a. Vest type devices
 - b. Rigid short board
 - 2. Provides stabilization and immobilization to the head, neck and torso.
 - 3. Used to immobilize non-critical sitting patients with suspected spinal injuries.
 - 4. **General application**
 - a. Start manual in-line immobilization.
 - b. Assess pulses, motor and sensory function in all extremities.
 - c. Assess the cervical area.
 - d. Apply a cervical immobilization device.
 - e. Position short board immobilization device behind the patient.
 - f. Secure the device to the patient's torso.
 - g. Evaluate torso and groin fixation and adjust as necessary without excessive movement of the patient.
 - h. Evaluate and pad behind the patient's head as necessary to maintain neutral in-line immobilization.
 - i. Secure the patient's head to the device.
 - j. Release manual immobilization of head.
 - k. Rotate or lift the patient to the long spine board.
 - l. Immobilize patient to long spine board.
 - m. Reassess pulses, motor and sensory function in all extremities.
- C. **Long backboards (Full body spinal immobilization devices)**
 - 1. Several different types of long board immobilization devices exist.
 - 2. Provide stabilization and immobilization to the head, neck and torso, pelvis and extremities.
 - 3. Used to immobilize patients found in a lying, standing, or sitting position.
 - 4. Sometimes used in conjunction with short backboards.
 - 5. **General application**
 - a. Start manual in-line immobilization.
 - b. Assess pulses, motor and sensory function in all extremities.
 - c. Assess the cervical area.
 - d. Apply a cervical immobilization device.
 - e. Position the device.
 - f. Move the patient onto the device by log roll, suitable lift or slide, or scoop stretcher. A log roll is:
 - (1) One EMT-Basic must maintain in-line immobilization.
 - (2) EMT-Basic at the head directs the movement of the patient.
 - (3) One to three other EMT-Basics control the movement of the rest of the body.
 - (4) Quickly assess posterior body if not already done in initial assessment.
 - (5) Position the long spine board under the patient.
 - (6) Roll patient onto the board at the command of the EMT-Basic holding in-line immobilization.

- g. Pad voids between the patient and the board.
 - (1) Adult
 - (a) Under the head as needed
 - (b) Under the torso as needed
 - (2) Infant and child - pad under the shoulders to the toes to establish a neutral position.
- h. Immobilize torso to the board by applying straps across the chest and pelvis and adjust as needed.
- i. Immobilize the patient's head to the board.
- j. Fasten legs, proximal to and distal to the knees.
- k. Reassess pulses, motor and sensation and record.

VI. Special Considerations

A. Rapid extrication

1. Indications

- a. Unsafe scene
- b. Unstable patient condition warrants immediate movement and transport.
- c. Patient blocks the EMT-Basic's access to another, more seriously injured, patient.
- d. Rapid extrication is based on time and the patient, and not the EMT-Basic's preference.

2. Procedure - refer to section on Lifting and Moving the Patient.

B. Helmet removal

1. Special assessment needs for patients wearing helmets.

- a. Airway and breathing.
- b. Fit of the helmet and patient's movement within the helmet.
- c. Ability to gain access to airway and breathing.

2. Indications for leaving the helmet in place

- a. Good fit with little or no movement of the patient's head within the helmet.
- b. No impending airway or breathing problems.
- c. Removal would cause further injury to the patient.
- d. Proper spinal immobilization could be performed with helmet in place.
- e. No interference with the EMT-Basic's ability to assess and reassess airway and breathing.

3. Indications for removing the helmet

- a. Inability to assess and/or reassess airway and breathing.
- b. Restriction of adequate management of the airway or breathing.
- c. Improperly fitted helmet allowing for excessive patient head movement within the helmet.
- d. Proper spinal immobilization cannot be performed due to helmet.
- e. Cardiac arrest.

4. Types of helmets:

- a. Sports
 - (1) Typically open anteriorly
 - (2) Easier access to airway
- b. Motorcycle
 - (1) Full face
 - (2) Shield
- c. Other

5. General rules for removal of a helmet.

- a. The technique for removal of a helmet depends on the actual type of helmet worn by the patient.
 - b. Take eyeglasses off before removal of the helmet.
 - c. One EMT-Basic stabilizes the helmet by placing his hands on each side of the helmet with the fingers on the mandible to prevent movement.
 - d. Second EMT-Basic loosens the strap.

 - e. The second EMT-Basic places one hand on the mandible at the angle of the jaw and the other hand posteriorly at the occipital region.
 - f. The EMT-Basic holding the helmet pulls the sides of the helmet apart and gently slips the helmet halfway off the patient's head then stops.
 - g. The EMT-Basic maintaining stabilization of the neck repositions, slides the posterior hand superiorly to secure the head from falling back after complete helmet removal.
 - h. The helmet is removed completely.
 - i. The EMT-Basic then can proceed with spinal immobilization as indicated in the spinal immobilization section.
- C. Infants and children - immobilize the infant or child on a rigid board appropriate for size (short, long or padded splint), according to the procedure outline in the spinal immobilization section. Special considerations:
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.

MODULE 6

Infants and Children

Lesson 6-1

Infants and Children

Declarative (What)

I. Preparatory

A. The human body

1. Developmental concerns

a. Newborns and infants - birth to 1 year of age.

- (1) Minimal stranger anxiety.
- (2) Do not like to be separated from parents.
- (3) Do not want to be suffocated by an oxygen mask.
- (4) Need to be kept warm - make sure hands and stethoscope are warmed before touching child.
- (5) Breathing rate best obtained at a distance - watch chest rise, note color and level of activity.
- (6) Examine heart and lungs first, head last. This is done to build confidence. It is best to obtain heart and lung sounds before the child becomes agitated.

b. Toddlers - 1 year to 3 years

- (1) Do not like to be touched.
- (2) Do not like being separated from parents.
- (3) Do not like having clothing removed. Remove, exam, replace.
- (4) Do not want to be suffocated by an oxygen mask.
- (5) Assure child that he was not bad. Children think their illness/injury is punishment.
- (6) Afraid of needles.
- (7) Fear of pain.
- (8) Should be examined trunk to head approach. This is done to build confidence. It should be done before child becomes agitated.

c. Preschool - 3 years to 6 years

- (1) Do not like to be touched.
- (2) Do not like being separated from parents.
- (3) Do not like having clothing removed. Remove, exam, replace.
- (4) Do not want to be suffocated by an oxygen mask.
- (5) Assure child that he was not bad. Children think that the illness/injury is a punishment.
- (6) Afraid of blood.
- (7) Fear of pain.
- (8) Fear of permanent injury.
- (9) Modest.

d. School Age - 6 years to 12 years

- (1) Afraid of blood.
- (2) Fear of pain.
- (3) Fear of permanent injury.
- (4) Modest.
- (5) Fear of disfigurement.

e. Adolescent - 12 years to 18 years

- (1) Fear of permanent injury.
- (2) Modest.
- (3) Fear of disfigurement.
- (4) Treat them as adults.
- (5) These patients may desire to be assessed privately, away from parents or guardians.

B. Anatomical and physiological concerns - airway

1. Small airways throughout the respiratory system are easily blocked by secretions and airway swelling.
2. Tongue is large relative to small mandible and can block airway in an unconscious infant or child.
3. Positioning the airway is different in infants and children, do not hyperextend the neck.
4. Infants are obligate nose breathers, so suctioning a secretion filled nasopharynx can improve breathing problems in an infant.
5. Children can compensate well for short periods of time.
 - a. Compensate by increasing breathing rate and increased effort of breathing.
 - b. Compensation is followed rapidly by decompensation due to rapid respiratory muscle fatigue and general fatigue of the infant.

II. Airway

A. Essential skills - review from module 2-1, Airway, with emphasis on infants and children.

B. Specific skills

1. Airway opening
 - a. Position to open airway is different - head-tilt chin-lift - do not hyperextend.
 - b. Jaw thrust with spinal immobilization.
2. Suctioning
 - a. Sizing
 - b. Depth
 - c. Technique
3. Clearing complete obstructions
 - a. Infants <1 year old
 - (1) Back blows/chest thrusts
 - (2) Visual foreign body removal
 - b. Children >1 year old
 - (1) Abdominal thrusts
 - (2) Visual foreign body removal
4. Airway adjuncts
 - a. Oral airways
 - (1) Adjunct, not for initial artificial ventilation
 - (2) Should not have a gag reflex
 - (3) Sizing
 - (4) Techniques of insertion - use tongue depressor.
 - (a) Insert tongue blade to the base of tongue.
 - (b) Push down against the tongue while lifting upward.
 - (c) Insert oropharyngeal airway directly in without rotation.
 - b. Nasal airways
 - (1) Adjunct not for initial artificial ventilation
 - (2) Sizing
 - (3) Technique of insertion
 - (4) Should not be used in head trauma

III. Oxygen Therapy

A. Oxygen delivery

1. Nonrebreathers
2. Blow by techniques
 - a. Hold tubing two inches from face
 - b. Insert tubing into a paper cup

B. Artificial ventilations

1. Mask sizing/bag sizing

2. Trauma considerations
3. Mask seal
 - a. Two hand
 - b. One hand
4. Mouth-to-mask artificial ventilations
5. Use of bag-valve-mask
 - a. Squeeze bag slowly and evenly enough to make chest rise adequately.
 - b. Rates for child and infant are 20 breaths per minute.
 - c. Provide oxygen at 100% concentration by using an oxygen reservoir.

IV. Assessment

- A. General impression of well versus sick child can be obtained from overall appearance.
 1. Assess mental status.
 2. Effort of breathing
 3. Color
 4. Quality of cry/speech
 5. Interaction with environment and parents
 - a. Normal behavior for child of this age.
 - b. Playing
 - c. Moving around
 - d. Attentive versus non-attentive
 - e. Eye contact
 - f. Recognizes parents
 - g. Responds to parents calling
 6. Emotional state
 7. Response to the EMT-Basic
 8. Tone/body position
- B. Approach to evaluation
 1. Begin from across the room
 - a. Mechanism of injury
 - b. Assessment of surroundings
 - c. General impression of well versus sick
 - d. Respiratory assessment
 - (1) Note chest expansion/symmetry
 - (2) Effort of breathing
 - (3) Nasal flaring
 - (4) Stridor, crowing, or noisy
 - (5) Retractions
 - (6) Grunting
 - (7) Respiratory rate
 - e. Perfusion assessment - skin color
 2. Hands on approach to infant or child patient assessment
 - a. Assess breath sounds
 - (1) Present
 - (2) Absent
 - (3) Stridor
 - (4) Wheezing
 - b. Assess circulation
 - (1) Assess brachial or femoral pulse
 - (2) Asses peripheral pulses
 - (3) Assess capillary refill

- (4) Assess blood pressure in children older than 3. Use appropriate size cuff.
- (5) Assess skin color, temperature and moisture
- c. Detailed physical exam - begin with a trunk to head approach.
 - (1) Situation and age dependant.
 - (2) Should help reduce the infant or child's anxiety.

V. Common Problems in Infants and Children

A. Airway obstructions

- 1. Partial airway obstruction - infant or child who is alert and sitting.
 - a. Stridor, crowing, or noisy
 - b. Retractions on inspiration
 - c. Pink
 - d. Good peripheral perfusion
 - e. Still alert, not unconscious.
 - f. Emergency medical care
 - (1) Allow position of comfort, assist younger child to sit up, do not lay down. May sit on parents lap.
 - (2) Offer oxygen
 - (3) Transport
 - (4) Do not agitate child
 - (5) Limited exam. Do not assess blood pressure.
- 2. Complete obstruction and altered mental status or cyanosis and partial obstruction.
 - a. No crying or speaking and cyanosis.
 - (1) Child's cough becomes ineffective
 - (2) Increased respiratory difficulty accompanied by stridor
 - (3) Victim loses consciousness
 - (4) Altered mental status
 - b. Clear airway.
 - (1) Infant foreign body procedures.
 - (2) Child foreign body procedures.
 - c. Attempt artificial ventilations with a bag-valve-mask and good seal.

B. Respiratory emergencies

- 1. Recognize the difference between upper airway obstruction and lower airway disease.
 - a. Upper airway obstruction - stridor on inspiration
 - b. Lower airway disease
 - (1) Wheezing and breathing effort on exhalation
 - (2) Rapid breathing (tachypnea) without stridor
- 2. Complete airway obstruction.
 - a. No crying
 - b. No speaking
 - c. Cyanosis is present
 - d. No coughing
- 3. Recognize signs of increased effort of breathing .
 - a. Early respiratory distress is indicated by any of the following:
 - (1) Nasal flaring
 - (2) Intercostal retraction (neck muscles), supraclavicular, subcostal retractions
 - (3) Stridor
 - (4) Neck and abdominal muscles - retractions
 - (5) Audible wheezing
 - (6) Grunting

- b. The presence of signs of symptoms of early respiratory distress and any of the following:
 - (1) Rate >60
 - (2) Cyanosis
 - (3) Decreased muscle tone
 - (4) Severe use of accessory muscles
 - (5) Poor peripheral perfusion
 - (6) Altered mental status
 - (7) Grunting
- c. Respiratory arrest
 - (1) Breathing rate less than 10 per minute
 - (2) Limp muscle tone
 - (3) Unconscious
 - (4) Slower, absent heart rate
 - (5) Weak or absent distal pulses.
- 4. Emergency medical care
 - a. Provide oxygen to all children with respiratory emergencies.
 - b. Provide oxygen and assist ventilation for severe respiratory distress.
 - (1) Respiratory distress and altered mental status
 - (2) Presence of cyanosis with oxygen
 - (3) Respiratory distress with poor muscle tone
 - (4) Respiratory failure
 - (5) Provide oxygen and ventilate with bag-valve-mask for respiratory arrest.

C. Seizures

- 1. Seizures in children who have chronic seizures are rarely life-threatening. However, seizures, including febrile, should be considered life-threatening by the EMT.
- 2. May be brief or prolonged.
- 3. Assess for presence of injuries which may have occurred during seizures.
- 4. Caused by fever, infections, poisoning, hypoglycemia, trauma, decreased levels of oxygen or could be idiopathic in children.
- 5. History of seizures. Ask the following questions:
 - a. Has the child had prior seizure(s)?
 - b. If yes, is this the child's normal seizure pattern?
 - c. Has the child taken his anti-seizure medications?
- 6. Emergency medical care
 - a. Assure airway position and patency
 - b. Position patient on side if no possibility of cervical spine trauma.
 - c. Have suction ready.
 - d. Provide oxygen and if in respiratory arrest or severe respiratory distress, assure airway position and patency and ventilate with bag-valve-mask.
 - e. Transport. Although brief seizures are not harmful, there may be a more dangerous underlying condition.
- 7. Seizures can be caused by head injury.
- 8. Inadequate breathing and/or altered mental status may occur following a seizure.

D. Altered mental status

- 1. Caused by a variety of conditions
 - a. Hypoglycemia
 - b. Poisoning
 - c. Post seizure
 - d. Infection

- e. Head trauma
 - f. Decreased oxygen levels
 - g. Hypoperfusion (shock)
 - 2. Emergency medical care
 - a. Assure patency of airway.
 - b. Be prepared to artificially ventilate/suction.
 - c. Transport.
- E. Poisonings
- 1. Common reason for infant and child ambulance calls
 - 2. Identify suspected container through adequate history. Bring container to receiving facility if possible.
 - 3. Emergency medical care
 - a. Responsive patient
 - (1) Contact medical control.
 - (2) Consider need to administer activated charcoal.
 - (3) Provide oxygen.
 - (4) Transport.
 - (5) Continue to monitor patient - may become unresponsive.
 - b. Unresponsive patient
 - (1) Assure patency of airway.
 - (2) Be prepared to artificially ventilate.
 - (3) Provide oxygen if indicated.
 - (4) Call medical control.
 - (5) Transport.
 - (6) Rule out trauma, trauma can cause altered mental status.
- F. Fever
- 1. Common reason for infant or child ambulance call
 - 2. Many causes - rarely life threatening. A severe cause is meningitis.
 - 3. Fever with a rash is a potentially serious consideration.
 - 4. Emergency medical care: Transport. Be alert for seizures.
- G. Shock (hypoperfusion)
- 1. Rarely a primary cardiac event.
 - a. Common:
 - (1) Diarrhea and dehydration
 - (2) Trauma
 - (3) Vomiting
 - (4) Blood loss
 - (5) Infection
 - (6) Abdominal injuries
 - b. Less common:
 - (1) Allergic reactions
 - (2) Poisoning
 - (3) Cardiac
 - 2. Signs and symptoms
 - a. Rapid respiratory rate
 - b. Pale, cool, clammy skin
 - c. Weak or absent peripheral pulses
 - d. Delayed capillary refill
 - e. Decreased urine output. Measured by asking parents about diaper wetting and looking at diaper.
 - f. Mental status changes

- g. Absence of tears, even when crying
- 3. Emergency medical care
 - a. Assure airway/oxygen.
 - b. Be prepared to artificially ventilate.
 - c. Manage bleeding if present.
 - d. Elevate legs.
 - e. Keep warm.
 - f. Transport. Note need for rapid transport of infant and child patients with secondary exam completed en route, if time permits.
- H. Near drowning
 - 1. Artificial ventilation is top priority.
 - 2. Consider possibility of trauma.
 - 3. Consider possibility of hypothermia.
 - 4. Consider possible ingestion, especially alcohol.
 - 5. Protect airway, suction if necessary.
 - 6. Secondary drowning syndrome - Deterioration after breathing normally from minutes to hours after event. All near drowning victims should be transported to the hospital.
- I. Sudden Infant Death Syndrome (SIDS)
 - 1. Signs and symptoms
 - a. Sudden death of infants in first year of life.
 - b. Causes are many and not clearly understood.
 - c. Baby most commonly discovered in the early morning.
 - 2. Emergency medical care
 - a. Try to resuscitate unless rigor mortis.
 - b. Parents will be in agony from emotional distress, remorse and imagined guilt.
 - c. Avoid any comments that might suggest blame to the parents.

VI. Trauma

- A. Injuries are the number one cause of death in infants and children.
- B. Blunt injury is most common.
 - 1. The pattern of injury will be different from adults.
 - a. Motor vehicle crashes
 - (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
 - c. Burns
 - d. Sports injuries - head and neck
 - e. Child abuse
- C. Specific body systems
 - 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 (hypoperfusion) 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.
 - 4. Extremities - extremity injuries are managed in the same manner as adults.
- D. Other trauma considerations
- 1. Pneumatic antishock garments
 - a. Use only if child fits, do not place infant in one leg of trouser.
 - b. Indications - trauma with signs of severe hypoperfusion and pelvic instability.
 - c. Do not inflate abdominal compartment.
 - 2. Criticality of burns
 - a. Cover with sterile dressing (non-stick, if possible, sterile sheets may be used).
 - b. Identify candidates for burn centers per local protocol.
- E. Emergency medical care
- 1. Assure airway position and patency. Use modified jaw thrust.
 - 2. Suction as necessary with large bore suction catheter.
 - 3. Provide oxygen.
 - 4. Assist ventilations for severe respiratory distress and ventilate with a bag-valve-mask for respiratory arrest.
 - 5. Provide spinal immobilization.
 - 6. Transport immediately.

VII. Child Abuse and Neglect

- A. Definition of abuse - improper or excessive action so as to injure or cause harm.
- B. Definition of neglect - giving insufficient attention or respect to someone who has a claim to that attention.
- C. EMT-Basic must be aware of condition to be able to recognize the problem.
- D. Physical abuse and neglect are the two forms of child abuse that the EMT-Basic is likely to suspect.
- E. Signs and symptoms of abuse
 - 1. Multiple bruises in various stages of healing.
 - 2. Injury inconsistent with mechanism described.
 - 3. Repeated calls to the same address.
 - 4. Fresh burns.
 - 5. Parents seem inappropriately unconcerned.
 - 6. Conflicting stories
 - 7. Fear on the part of the child to discuss how the injury occurred.
- F. Signs and symptoms of neglect
 - 1. Lack of adult supervision.

2. Malnourished appearing child.
 3. Unsafe living environment
 4. Untreated chronic illness; e.g., asthmatic with no meds.
 - G. CNS injuries are the most lethal - shaken baby syndrome
 - H. Do not accuse in the field
 1. Accusation and confrontation delays transportation.
 2. Bring objective information to the receiving facility
 - I. Reporting required by state law.
 1. Local regulations
 2. Objective - what you see and what you hear - NOT what you think.
- VIII. Infants and Children with Special Needs
- A. This can include many different types of children.
 1. Premature babies with lung disease
 2. Babies and children with heart disease
 3. Infants and children with neurologic disease
 4. Children with chronic disease or altered function from birth
 - B. Often these children will be at home, technologically dependent.
 1. Tracheostomy tube
 - a. Various types
 - b. Complications
 - (1) Obstruction
 - (2) Bleeding
 - (3) Air leak
 - (4) Dislodged
 - (5) Infection
 - c. Emergency medical care
 - (1) Maintain an open airway.
 - (2) Suction.
 - (3) Maintain position of comfort.
 - (4) Transport.
 2. Home artificial ventilators
 - a. Various types
 - b. Parents familiar with operation
 - c. Emergency medical care
 - (1) Assure airway
 - (2) Artificially ventilate with oxygen
 - (3) Transport
 - C. Central Lines
 1. Intravenous lines (IVs) that are placed near the heart for long term use
 2. Complications
 - a. Cracked line
 - b. Infection
 - c. Clotting off
 - d. Bleeding
 3. Emergency medical care
 - a. If bleeding, apply pressure.
 - b. Transport.
 - D. Gastrostomy tubes and gastric feeding
 1. Description - tube placed directly into stomach for feeding. Comes in many shapes. These patients usually cannot be fed by mouth.
 2. Be alert for breathing problems.

- a. Assure adequate airway.
- b. Have suction available.
- c. If a diabetic patient, be alert for altered mental status. Infant will become hypoglycemic quickly if they cannot be fed.
- d. Provide oxygen.
- e. Transport
 - (1) Sitting
 - (2) Lying on right side, head elevated

E. Shunts

- 1. Description - device running from brain to abdomen to drain excess cerebral spinal fluid. Will find reservoir on side of skull.
- 2. Change in mental status
- 3. Prone to respiratory arrest
 - a. Manage airway.
 - b. Assure adequate artificial ventilation.
 - c. Transport.

IX. Family Response

- A. A child cannot be cared for in isolation from the family; therefore, you have multiple patients.
- B. Striving for calm, supportive interaction with family will result in improved ability to deal with the child.
 - 1. Calm parents = calm child; agitated parents = agitated child
 - 2. Anxiety arises from concern over child's pain; fear for child's well-being
 - 3. Worsened by sense of helplessness
- C. Parent may respond to EMT-Basic with anger or hysteria.
- D. Parents should remain part of the care unless child is not aware or medical conditions require separation.
- E. Parents should be instructed to calm child; can maintain position of comfort and/or hold oxygen.
- F. Parents may not have medical training, but they are experts on what is normal or abnormal for their children and what will have a calming effect.

X. 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. Provider should realize that much of what they learned about adults applies to children; they need to remember the differences.
- E. Infrequent encounters with sick children; advance preparation is important (practice with equipment and examining children).

MODULE 7

Operations

Lesson 7-1

Ambulance Operations

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
- 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
 - (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) 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.
 - (b) Spine stabilization if necessary.
 - d. Total number of patients.
 - e. Need for additional help or assistance.
- 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).
- F. 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.
- G. 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, Lesson 1-5).
- H. 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.
- I. Post run
 - 1. Refuel unit.
 - 2. File reports.
 - 3. Complete cleaning and disinfection procedures.
 - 4. Notify dispatch.
- II. Air Medical Consideration
 - A. Utilization
 - B. Landing zones
 - C. Safety

MODULE 7

Operations

Lesson 7-2

Gaining Access

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 - requires use of tools, special equipment. These are separate programs that should 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.

Identify students or groups of students who are having difficulty with this subject content. Complete

MODULE 7

Operations

Lesson 7-3

Overviews

- 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 SCBA.
 - 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
 - G. National Fire Protection Association Haz Mat requirements for EMS providers
 - 1. NFPA 479
 - 2. OSHA 1910.120
- II. Incident Management Systems
 - A. An incident management system has been developed to assist with the control, direction, and coordination of emergency response resources.
 - 1. It provides an orderly means of communication and information for decision making.
 - 2. Interactions with other agencies are easier because of the single coordination.
 - B. Structure - after an incident manager is determined, EMS sectors are established as needed.
 - 1. Extrication sector
 - 2. Treatment sector
 - 3. Transportation sector
 - 4. Staging sector
 - 5. Supply sector
 - 6. Triage sector
 - 7. Mobile command center
 - C. Role of various individuals/organizations at the scene
 - 1. Individuals at the scene will be assigned to particular roles in one of the sectors.
 - 2. Upon arrival, the EMT-Basic should report to the sector officer for specific duties.
 - 3. Once assigned a specific task, the EMT-Basic should complete the task and report back to the sector officer.

III. Multiple Casualty Situations (MCS)

- A. Definition - an event that places a great demand on resources, be it equipment or personnel.
- B. Basic triage - sorting multiple casualties into priorities for emergency care or transportation to definitive care. Priorities are given in three levels.
 - 1. Highest priority
 - a. Airway and breathing difficulties
 - b. Uncontrolled or severe bleeding
 - c. Decreased mental status
 - d. Patients with severe medical problems
 - e. Shock (hypoperfusion)
 - f. Severe burns
 - 2. Second Priority
 - a. Burns without airway problems
 - b. Major or multiple bone or joint injuries
 - c. Back injuries with or without spinal cord damage
 - 3. Lowest priority
 - a. Minor painful, swollen, deformed extremities
 - b. Minor soft tissue injuries
 - c. Death
- C. Procedures
 - 1. Most knowledgeable EMS provider arriving on-scene first becomes triage officer.
 - 2. Additional help should be requested.
 - 3. Perform initial assessment on all patients first.
 - 4. Assign available personnel and equipment to priority one patients.
 - 5. Patient transport decisions are based on a variety of factors
 - a. Prioritization
 - b. Destination facilities
 - c. Transportation resources
 - 6. Triage officer remains at scene to assign and coordinate personnel, supplies and vehicles.