National Emergency Medical Services Education Standards

Emergency Medical Technician Instructional Guidelines

New York State Bureau of EMS Version

Yellow highlighted areas are those areas that are the minimum essential content for refresher courses for providers certified under the previous NYS curriculum.

EMS NHTSA National Highway Traffic Safety Administration

Preparatory

EMS Systems

EMT Education Standard

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

EMT-Level Instructional Guideline

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

I. The Emergency Medical Services System
- A. History
  - 1. 1960s
  - 2. Evolution to current EMS systems
- B. NHTSA Technical Assistance Program Assessment Standards
  - 1. Regulation and policy
  - 2. Resource management
  - 3. Human resources and training
  - 4. Transportation
  - 5. Facilities
- C. Access to Emergency Medical Services
- D. Education
  - 1. Levels of EMS licensure
  - 2. National EMS Education Agenda for the Future: A Systems Approach
- E. Authorization to Practice
  - 1. Legislative decisions on scope of practice
  - 2. State EMS office oversight
  - 3. Medical oversight
    - a. Clinical protocols
      - i. Offline
      - ii. Online
      - iii. Standing orders
    - b. Quality improvement
    - c. Administrative
  - 4. Local credentialing
  - 5. Administrative
  - 6. Employer policies and procedures

II. Roles, Responsibilities, and Professionalism of EMS Personnel
- A. Roles and Responsibilities
  - 1. Maintain vehicle and equipment readiness

2. Safety
    a. Personal
    b. Patient
    c. Others on the scene
3. Operate emergency vehicles
4. Provide scene leadership
5. Perform patient assessment
6. Administer emergency medical care to a variety of patients with varied medical conditions
7. Provide emotional support
    a. Patient
    b. Patient's family
    c. Other responders
8. Integration with other professionals and continuity of care
    a. Medical personnel
    b. Law enforcement
    c. Emergency management
    d. Home healthcare providers
    e. Other responders
9. Resolve emergency incident
10. Maintain medical and legal standards
11. Provide administrative support
12. Enhance professional development
13. Develop and maintain community relations

B. Professionalism
1. Characteristics of professional behavior
    a. Integrity
    b. Empathy
    c. Self-motivation
    d. Appearance and hygiene
    e. Self-confidence
    f. Time management
    g. Communication
        i. verbal
        ii. written
    h. Teamwork and diplomacy
    i. Respect for patients, co-workers and other healthcare professionals
    j. Patient advocacy
    k. Careful delivery of service
2. Maintenance of certification and licensure
    a. Personal responsibility
    b. Continuing education
    c. Skill competency verification
    d. Criminal implications
    e. Fees

III. Quality Improvement
- A. System for Continually Evaluating and Improving Care
- B. Continuous Quality Improvement (CQI)
- C. Dynamic Process

IV. Patient Safety
- A. Significant – One of the Most Urgent Health Care Challenges
- B. High-Risk Activities
  1. Hand-off
  2. Communication issues
  3. Dropping patients
  4. Ambulance crashes
  5. Spinal immobilization
- C. How Errors Happen
  1. Skills-based failure
  2. Rules-based failure
  3. Knowledge-based failure
- D. Preventing Errors
  1. Environmental
     - a. Clear protocols
     - b. Light
     - c. Minimal interruptions
     - d. Organization and packaging of drugs
  2. Individual
     - a. Reflection in action
     - b. Constantly question assumptions
     - c. Reflection bias
     - d. Use decision aids
     - e. Ask for help

Preparatory
Research

EMT Education Standard

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

EMT-Level Instructional Guideline

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

I. Evidence-Based Decision-Making
   A. Traditional Medical Practice Is Based on
      1. Medical knowledge
      2. Intuition
      3. Judgment
   B. High-Quality Patient Care Should Focus on Procedures Proven Useful in Improving Patient Outcomes
   C. The Challenge for EMS Is the Relative Lack of Prehospital Research
   D. Evidence-Based Decision-Making Technique
      1. Formulate a question about appropriate treatments
      2. Search medical literature for related research
      3. Appraise evidence for validity and reliability
      4. If evidence supports a change in practice, adopt the new therapy allowing for unique patient needs

Preparatory

Workforce Safety and Wellness

EMT Education Standard

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

EMT-Level Instructional Guideline

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

I. Standard Safety Precautions
   - A. Hand washing
   - B. Adherence to Standard Precautions/OSHA Regulation
   - C. Safe Operation of EMS/Patient Care Equipment
   - D. Environmental Control
   - E. Occupational Health and Blood borne Pathogens
     1. Immunizations
     2. Sharps

II. Personal Protective Equipment

III. Stress Management
   - A. Types of Stress Reactions
     1. Acute stress reaction
     2. Delayed stress reaction
     3. Cumulative stress reaction
   - B. Stress Management
     1. Change in lifestyle
     2. Balance in life
     3. Recognize response to family and friends
     4. Change in work environment
     5. Seek professional assistance
   - C. Dealing With Death and Dying (stages)
     1. Denial
     2. Anger
     3. Bargaining
     4. Depression
     5. Acceptance

IV. Prevention of Work-Related Injuries
- A. Vehicle restraint systems
- B. Safe lifting techniques
- C. Adequate sleep
- D. Physical fitness and nutrition
- E. Hazard awareness
- F. Adherence to Standard Precautions/OSHA regulations
- G. Disease transmission prevention
  - 1. Communicable
  - 2. Blood borne

V. Lifting and Moving Patients
- A. Lifting techniques
  - 1. Safety Precautions
  - 2. Guidelines for lifting
- B. Safe Lifting of Cots and Stretchers
  - 1. Power-lift or squat lift position
  - 2. Power grip
  - 3. Back in locked-in position
  - 4. Carrying
    - a. Precautions for carrying
    - b. Guidelines for carrying
    - c. Correct carrying procedure
    - d. One-handed carrying technique
    - e. Correct carrying procedure on stairs
  - 5. Reaching
    - a. Guidelines for reaching
    - b. Application for reaching techniques
    - c. Correct reaching for log rolls
  - 6. Pushing and pulling guidelines
    - a. Emergency move
      - i. fire or danger of fire
      - ii. explosives or other hazardous materials
      - iii. other hazards at the scene
      - iv. gain access to other patients in a vehicle who need life-saving care
      - v. patient's location or position (e.g., a cardiac arrest patient sitting in a chair or lying on a bed)
    - b. Indications for urgent move
      - i. altered mental status
      - ii. inadequate breathing
      - iii. shock (hypoperfusion)
    - c. Non-urgent move
  - 7. Emergency moves
    - a. Danger to patient
    - b. Techniques

8. Urgent moves
    a. Danger to patient
    b. Techniques

C. Techniques
1. Non-urgent moves
    a. Direct ground lift (no suspected spine injury)
    b. Extremity lift (no suspected extremity or back injuries)
    c. Transfer of supine patient from bed to stretcher
        i. direct carry
        ii. draw sheet method

D. Equipment
1. Stretchers/cots
    a. Wheeled stretcher
    b. Portable stretcher
    c. Stair chair
    d. Scoop or orthopedic stretcher
    e. Flexible stretcher
    f. Bariatric stretcher
    g. Pneumatic or electronic stretchers
2. Standard
3. Tracked systems (i.e. backboards)
    i. long
    ii. short
4. Neonatal Isolette
5. Maintenance—follow manufacturer's directions for inspection, cleaning, repair, and upkeep

E. Patient Positioning
1. Unresponsive patient without suspected spine injury
2. A patient with chest pain, discomfort, or difficulty breathing
3. A patient with suspected spine injury
4. Pregnant patient with hypotension
5. A patient who is nauseated or vomiting
6. Bariatric patients
7. Patient Size

F. Medical Restraint
1. Use of Force Doctrine
2. Reasonable Prevention of Harm
    a. Suicidal
    b. Homicidal
    c. Ambulances
    d. Ramps
    e. Winches

G. Personnel Considerations

VI. Disease Transmission

VII. Wellness Principles

- A. Physical Wellbeing
  - 1. Physical Fitness
    - a. Cardiovascular endurance
    - b. Muscle strength
    - c. Muscle flexibility
  - 2. Sleep
  - 3. Disease prevention
  - 4. Injury prevention
- B. Mental Wellbeing
  - 1. Alcohol and drug issues
  - 2. Smoking cessation
  - 3. Stress management
  - 4. Relationship issues

Preparatory

Documentation

EMT Education Standard

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

EMT-Level Instructional Guideline

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

I. Principles of Medical Documentation and Report Writing
   A. Minimum Dataset
      1. Patient information
         a. Chief complaint
         b. Initial assessment
         c. Vital signs
         d. Patient demographics
      2. Administrative information
         a. Time incident reported
         b. Time unit notified
         c. Time of arrival at patient
         d. Time unit left scene
         e. Time of arrival at destination
         f. Time of transfer of care
      3. Accurate and synchronous clocks
   B. Prehospital Care Report
      1. Functions
         a. Continuity of care
         b. Legal document
            i. documented what emergency medical care was provided, the status of the patient on arrival at the scene, and any changes upon arrival at the receiving facility
            ii. the person who completed the form ordinarily must go to court with the form
            iii. 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
            i. billing
            ii. service statistics

e. Research
f. Evaluation and continuous quality improvement

2. Uses
   a. Types
      i. traditional written form with check boxes and a section for narrative
      ii. computerized version where information is filled in by means of an electronic device or over the Internet
   b. Sections
      i. run data
      ii. patient data
      iii. check boxes
         a) be sure to fill in the box completely
         b) avoid stray marks
      iv. narrative section (if applicable)
         a) describe, don't conclude
         b) include pertinent negatives
         c) record important observations about the scene
         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
         g) State reporting requirements
         h) be sure to spell words correctly, especially medical words
         i) for every reassessment, record time and findings
      v. other State or local requirements
   c. Confidentiality
   d. Distribution
   e. Health Information Portability and Accountability Act of 1996 (HIPAA)
3. Falsification Issues
   a. When an error of omission or commission occurs, document what did or did not happen and what (if any) steps were taken to correct the situation
   b. Falsification of information on the prehospital care report
   c. Specific areas of difficulty
      i. vital signs—document only the vital signs that were actually taken
      ii. 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 leaving the scene
   a. Try again to persuade the patient to go to a hospital
   b. Ensure the patient is able to make a rational, informed decision

c. Inform the patient why he should go and what may happen to him if he does not
d. Consult medical direction as directed by local protocol
e. If the patient still refuses, document any assessment
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
    i. complete patient assessment
    ii. if the patient refused care or did not allow a complete assessment, document that the patient did not allow for proper assessment and document whatever assessments were completed
    iii. care EMT wished to provide for the patient
    iv. statement that the EMT explained to the patient the possible consequences of failure to accept care, including potential death
    v. offer alternative methods of gaining care
    vi. state willingness to return

D. Special Situations/Reports/Incident Reporting
1. Correction of errors
    a. Errors discovered while the report form is being hand-written
        i. draw a single horizontal line through the error, initial it, and write the correct information beside it
        ii. do not try to obliterate the error—this may be interpreted as an attempt to cover up a mistake
    b. Errors discovered after a hand-written report form is submitted
        i. 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
        ii. if information was omitted, add a note with the correct information, the date, and the EMT's initials
    c. Errors discovered while/after completing an electronic report
        i. most electronic prehospital care report systems have a method for entering and amending the report
        ii. if there is no way to electronically submit a change or addendum one should follow the correction method used for a handwritten report that has already been submitted on the printout of the electronic report
2. Multiple-Casualty Incidents (MCI)
    a. When there is not enough time to complete the form before the next call, the EMT will need to fill out the report later

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

Preparatory

EMS System Communication

EMT Education Standard

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

EMT-Level Instructional Guideline

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

I. EMS Communication System
   A. System Components
      1. Base station
      2. Mobile radios (transmitter/receivers)
         a. Vehicular mounted device
         b. Mobile transmitters usually transmit at lower power than base stations (typically 20-50 watts)
         c. Typical transmission range is 10-15 miles over average terrain
      3. Portable radios (transmitter/receivers)
         a. Handheld device
         b. Typically have power output of 1-5 watts, limiting their range
      4. Repeater/base station
      5. Digital radio equipment
      6. Cellular telephones
   B. Radio Communications
      1. Radio frequencies
      2. Response to the scene
         a. The dispatcher needs to be notified that the call was received
         b. Dispatch needs to know that the unit is en route
      3. Arrival at the scene – dispatcher must be notified
      4. Depart the scene
         a. Dispatcher must be notified
         b. Prolonged on-scene times with absence of communications
      5. Arrival at the receiving facility or rendezvous point – dispatcher must be notified
      6. Arrival for service after patient transfer – dispatcher must be notified

II. Communication With Other Health Care Professionals

A. Communication With Medical Control

1. Medical control
   a. At the receiving facility
   b. At a separate site
2. EMTs may need to contact medical control for consultation and to get orders for administration of medications
3. EMTs must be accurate
4. After receiving an order for a medication or procedure—repeat the order back word for word
5. Orders that are unclear or appear to be inappropriate should be questioned or clarified for the EMT

B. Communication With Receiving Facilities

1. EMT having the right room, equipment, and personnel prepared or allow the facility to plan for the patient
2. Patient reporting concepts
   a. When speaking on the radio, keep these principles in mind:
      i. make sure the radio is on and volume is properly adjusted
      ii. listen to the frequency and ensure it is clear before beginning a transmission
      iii. press the "press to talk" (PTT) button on the radio and wait for one second before speaking
      iv. speak with lips about two to three inches from the microphone
      v. address the unit being called, and then give the name of the unit
      vi. the unit being called will signal that the transmission should start
      vii. speak clearly, calmly, and slowly in a monotone voice
      viii. keep transmissions brief
      ix. use clear text
      x. avoid codes or agency-specific terms
      xi. avoid meaningless phrases like "be advised"
      xii. courtesy is assumed, one should limit saying "please," "thank you," and "you're welcome"
      xiii. when transmitting a number that might be confused (e.g., a number in the teens), give the number, then give the individual digits
      xiv. the airwaves are public and scanners are popular
      xv. remain objective and impartial in describing patients
      xvi. do not use profanity on the air
      xvii. avoid words that are difficult to hear like "yes" and "no;" use "affirmative" and "negative"
      xviii. use the standard format for transmission of information
      xix. When the transmission is finished, indicate this by saying "over"

xx. avoid codes
xxi. avoid offering a diagnosis of the patient's problem
xxii. use EMS frequencies only for EMS communication
xxiii. reduce background noise

b. Notify the dispatcher when the unit leaves the scene

c. When communicating with medical direction or the receiving facility, a verbal report should be given. The essential elements of such a report, in an order that is efficient and effective, are:
   i. identify unit and level of provider (can utilize the name of the provider giving the report as well as the unit identification)
   ii. estimated time of arrival
   iii. current patient condition
   iv. patient's age and sex
   v. mental status
   vi. chief complaint
   vii. brief, pertinent history of the present illness
   viii. major past illnesses
   ix. baseline vital signs
   x. pertinent findings of the physical exam
   xi. emergency medical care given
   xii. response to emergency medical care

d. After giving this information, the EMT will continue to assess the patient

e. Arrival at the hospital
   i. the dispatcher must be notified
   ii. in some systems, the hospital should also be notified

f. Leaving the hospital for the station – dispatcher should be notified

g. Arrival at the station – dispatcher should be notified

C. System Maintenance
   1. Communication equipment needs to be checked to ensure that a radio is not drifting form its assigned frequency
   2. As technology changes, new equipment becomes available that may have a role in EMS systems
   3. EMT need to be able to consult on-line medical direction, and EMS system must provide back-up

D. Phone/Cellular Communications
   1. Should be treated similar to radio communications when it comes to content and strategies for delivery of pertinent information
   2. The EMT should be familiar with important and commonly utilized telephone numbers, such as medical control, local hospital Emergency Departments, dispatch centers
   3. The EMT should also have a familiarity with cellular technologies and knowledge of the location of cellular dead spots in the area
   4. There should be another plan for when a cellular transmission fails during a report or communication with another agency

III. Team Communication and Dynamics

IV. Communication

A. Interpersonal Communication

1. The EMT should self-introduce at the start of any conversation
2. Make and keep eye contact, if appropriate
3. When practical, position yourself at a level lower than the patient or on the same level
4. Be honest with the patient
5. Use language the patient can understand and avoid medical jargon
6. Be aware of your own body language
7. Speak calmly, clearly, slowly and distinctly
8. Use the patient's proper name, either first or last, depending on the circumstances
9. If a patient has difficulty hearing, speak clearly with lips visible
10. Allow the patient enough time to answer a question before asking the next one
11. Act and speak in a calm, confident manner

B. Communication With Hearing-Impaired, Non-English Speaking Populations and Use of Interpreters—Be Positioned to Address Any of These Special Situations

Preparatory

Therapeutic Communication

EMT Education Standard

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

EMT-Level Instructional Guideline

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

I. Principles of Communicating With Patients in a Manner That Achieves a Positive Relationship
   - A. Adjusting Communication Strategies
     - 1. Age-appropriate
     - 2. Stage of development
     - 3. Patients with special needs (i.e. hearing-impaired patients)
     - 4. Differing cultures
       - a. Transcultural considerations
         - i. introduce yourself and the way in which you want to be called
         - ii. both the EMT and the patient will bring cultural stereotypes to a professional relationship
         - iii. ethnocentrism
         - iv. cultural imposition
         - v. space
           - a) intimate zone
           - b) personal distance
           - c) social distance
           - d) public distance
         - vi. cultural issues
           - a) variety of space
           - b) accept the sick role in different ways
           - c) nonverbal communication may be perceived differently
           - d) Asians, Native Americans, Indochinese, and Arabs may consider direct eye contact impolite or aggressive
         - vii. touch
         - viii. language barrier

B. Interviewing Techniques
  1. Non-verbal skills
    a. Physical appearance
      i. interviewer
      ii. patient
    b. Posture and gestures
      i. interviewer
      ii. patient
      iii. gestures
        a) facial expressions
        b) eye contact
        c) voice
        d) touch
  2. Using questions
    a. Open-ended questions
    b. Closed or direct questions
    c. One question at a time
    d. Choose language the patient understands
  3. Hazards of interviewing
    a. Providing false assurance or reassurance
    b. Giving advice
    c. Leading or biased questions
    d. Talking too much
    e. Interrupting
    f. Using "why" questions
    g. Authority
    h. Professional jargon
C. Verbal Defusing Strategies
  1. Interviewing a Hostile Patient
    a. Build rapport with patient
    b. Maintain professional non-threatening demeanor
D. Family Presence Issues
  1. Family presence issues
    a. Situations
      i. adult
      ii. children
      iii. elderly
    b. Department policies
    c. EMT response
    d. Family preference

II. Communication
A. Communication Process and Components
  1. Encoding
  2. Message
  3. Decoding

4. Receiver
5. Feedback

III. Types of Responses
A. Facilitation
B. Silence
C. Reflection
D. Empathy
E. Clarification
F. Confrontation
G. Interpretation
H. Explanation
I. Summary

IV. Developing Patient Rapport
A. Put the Patient at Ease
B. Put Yourself at Ease

V. Strategies to Ascertain Information
A. Obtaining Information on Complaints
1. Resistance
2. Shifting focus
3. Defense mechanisms
4. Distraction

VI. Special Interview Situations
A. Patients Unmotivated to Talk
1. Most patients are more than willing to talk
2. Techniques to use
a. Start the interview in the normal manner
b. Attempt to use open-ended questions
c. Provide positive feedback
d. Make sure the patient understands the questions
e. Continue to ask questions
f. Utilize language line if available
B. Patients Under the Influence of Street Drugs or Alcohol
C. Communication With Elderly
1. Potential for visual deficit
2. Potential for auditory deficit
3. Obtain glasses and hearing aid
D. Communication With Pediatric Patient
1. Use parent and caregiver
2. Clear explanations

Preparatory

Medical/Legal and Ethics

EMT Education Standard

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

EMT-Level Instructional Guideline

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

I. Consent/Refusal of Care
   A. Consent to Care
      a. Nature of illness
      b. Treatments recommendations
      c. Risks (i.e. refusal)
      d. Alternatives
   B. Types of Consent
      1. Expressed consent -- Non-verbal
      2. Informed consent -- Research
      3. Implied consent (emergency doctrine)
         a. Physical incapacitation
         b. Mental incapacitation
      4. Involuntary consent
         a. Mental health
         b. Incarceration
      5. Minors
         a. Parental permission
            i. in loco parentis
            ii. emergency doctrine
         b. Emancipation
            i. married
            ii. armed services
            iii. independence
      6. Medical restraint -- use of force doctrine
         a. reasonable prevention of harm
            i. suicidal
            ii. homicidal
         b. non-punitive
   C. Legal Complications Related to Consent
      1. Abandonment
      2. False imprisonment

3. Assault
4. Battery

D. Refusal of Care and/or Transportation
1. Patient must be alert and oriented to person, place, and time
2. Patient must be informed of the risks of refusing care (e.g., death)
3. Patient must be informed if problems return/persist they should call EMS or see a physician
4. Against medical advice
a. Due diligence
i. standard of care
ii. medical control
b. Documentation

II. Confidentiality
A. Obligation to Protect Patient Information
B. Health Information Portability and Accountability Act (HIPAA)
C. Responsibility Arising From Physician – Patient Relationship
1. Assessment findings
2. Treatments rendered
D. Privileged Communications
1. Need to know
2. Education
3. Legally mandated
a. Child abuse reported
b. Subpoena
4. Third party billing
5. Release of medical information
E. Breach of Confidentiality
1. Libel
2. Slander

III. Advanced Directives
A. Patient Self-Determination Act
1. Do Not Resuscitate (DNR)
2. Living wills
3. Durable power of attorney

IV. Tort and Criminal Actions
A. Criminality
1. Breaches of conduct
a. Assault
b. Battery
c. Kidnapping
2. Mandatory reporting requirements
a. Abuse and assault
i. child abuse or neglect

ii. elder abuse
iii. domestic violence
b. Criminality
i. sexual assault
ii. penetrating trauma
a) gunshot
b) stab wounds
c. Communicable diseases
i. reportable
ii. animal bites

B. Civil Tort
1. Concept of Negligence
a. Res Ispa Loquitur
b. Negligence per se
2. Elements of negligence
a. Duty to act
b. Breach of duty
c. Damages to plaintiff
i. physical (e.g., lost earnings)
ii. psychological (e.g., pain and suffering)
iii. punitive
d. Proximate causation
e. Defenses
i. good samaritan
ii. governmental immunity
iii. statute of limitations
iv. contributory negligence
f. Protection from liability
i. professionalism
ii. standard of care
iii. liability insurance

C. Mandatory Reporting
1. Legally compelled to notify authorities
a. Abuse
b. Neglect
2. Arises from special relationship with patient
3. Legal liability for failure to report

V. Evidence Preservation

VI. Statutory Responsibilities

VII. Mandatory Reporting

VIII. Ethical Principle/Moral Obligations
A. Morals – concept of right and wrong

B. Ethics
   1. Branch of philosophy
   2. Study of morality
C. Applied Ethics (i.e., Use of Ethical Values)
D. Ethical Conflicts
   1. Futility of care (cardiac arrest in the wilderness)
   2. Allocation of limited resources – medical rationing (e.g., Triage)
   3. Professional misconduct (e.g., patient abuse)
   4. Economic triage (e.g., patient dumping)

Anatomy and Physiology

EMT Education Standard

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

EMT-Level Instructional Guideline

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

I. Anatomy and Body Functions
- A. Anatomical Planes
  - 1. Frontal or coronal plane
  - 2. Sagittal or lateral plane
  - 3. Transverse or axial plane
- B. Standard Anatomic Terms
- C. Body Systems
  - 1. Skeletal
    - a. Components
      - i. skull
      - ii. face
      - iii. vertebral column
      - iv. thorax
      - v. pelvis
      - vi. upper extremities
      - vii. lower extremities
    - b. Joints
    - c. Function
  - 2. Muscular
    - a. Types
      - i. skeletal
      - ii. smooth
      - iii. cardiac
    - b. Function
  - 3. Respiratory system
    - a. Structures
      - i. upper airway
        - a) nose
        - b) mouth/teeth
        - c) tongue/jaw
        - d) nasopharynx
        - e) oropharynx

f) epiglottis
g) larynx
ii. lower airway
a) trachea
b) bronchi
c) bronchioles
d) alveoli
iii. structures that support ventilation
a) chest wall
b) pleura
c) diaphragm
d) intercostal muscles
e) phrenic nerve
f) pulmonary capillaries
b. Anatomic differences between pediatric and adult airway anatomy
c. Function
i. ventilation
ii. respiration
iii. alveolar/capillary gas exchange
iv. buffer
4. Circulatory system
a. Structures
i. heart
a) chambers
b) coronary arteries
ii. arterial
a) aorta
b) arteries
c) arterioles
iii. capillaries
a) pulmonary
b) tissue/cells
iv. venous
a) venae cava
b) veins
c) venules
b. Blood components
i. red blood cells
ii. white blood cells
iii. clotting factors
iv. plasma
c. Function
i. perfusion
ii. tissue/cell gas exchange
iii. reservoir
iv. blood buffer

v. infections response
vi. coagulation

5. Nervous system
   a. Structural division
      i. central nervous system (CNS)
         a) brain
         b) spinal cord
      ii. peripheral nervous system (PNS)
   b. Functional
      i. autonomic
         a) sympathetic
         b) parasympathetic
   c. Functions of the nervous system
      i. consciousness
         a) cerebral hemispheres
         b) reticular activating system (center of consciousness)
      ii. sensory function
      iii. motor function
      iv. fight-or-flight response
6. Integumentary (skin)
   a. Structures
      i. epidermis
      ii. dermis
      iii. subcutaneous layer
   b. Functions of the Skin
      i. protection
      ii. temperature control
7. Digestive system
   a. Structures
      i. esophagus
      ii. stomach
      iii. intestines
      iv. liver
      v. pancreas
8. Endocrine system
   a. Structures
      i. pancreas
      ii. adrenal glands
         a) epinephrine
         b) norepinephrine
   b. Function
      i. control of blood glucose level
      ii. stimulate sympathetic nervous system
         a) receptors
         b) beta 2 stimulation

9. Renal system
    a. Structures
        i. kidneys
        ii. bladder
        iii. urethra
    b. Function
        i. blood filtration
        ii. fluid balance
        iii. buffer
10. Reproductive system
    a. Male
        i. structures
            a) testicles
            b) penis
        ii. functions
            a) reproduction
            b) urination
            c) hormones
    b. Female
        i. structures
            a) ovaries
            b) fallopian tubes
            c) uterus
            d) vagina
        ii. functions
            a) reproduction
            b) hormones

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

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

III. Age-Related Variations for Pediatrics and Geriatrics (see Special Patient Populations)

Medical Terminology

EMT Education Standard

Uses foundational anatomical and medical terms and abbreviations in written and oral communication with colleagues and other health care professionals.

EMT-Level Instructional Guideline

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

I. Medical Terminology
   - A. Prefixes
   - B. Root Words
   - C. Suffixes
   - D. Combining Forms

II. Medical Terms
   - A. Associated With Body Structure
   - B. Associated With Body Systems
   - C. Associated With Body Direction or Position

III. Standard Medical Abbreviations and Acronyms

Pathophysiology

EMT Education Standard

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

EMT-Level Instructional Guideline

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

I. Composition of Ambient Air
   - A. Oxygen
   - B. Nitrogen
   - C. Carbon Dioxide
   - D. Fraction of Inspired Oxygen
   - E. Fraction of Delivered Oxygen

II. Patency of the Airway
   - A. Anatomical Considerations
   - B. Airway Obstruction
     - 1. Various anatomic levels
       - a. Nasopharynx
       - b. Oropharynx
       - c. Pharynx
       - d. Larynx
       - e. Trachea
       - f. Bronchi
     - 2. Causes of obstruction

III. Respiratory Compromise
   - A. Changes in Structure or Function of
     - 1. Anatomic boundaries of the thorax
     - 2. Pleural lining
     - 3. Muscles of ventilation
     - 4. Accessory muscles of ventilation
     - 5. Inhalation
       - a. Muscle activity
       - b. Changes in intrapleural and intrapulmonary pressures
       - c. Active process
     - 6. Exhalation
       - a. Muscle activity

b. Changes in intrapleural and intrapulmonary pressures
c. Passive process

7. Minute ventilation
   a. Tidal volume
   b. Respiratory rate
8. Alveolar ventilation
   a. Tidal volume
   b. Dead air space
   c. Respiratory rate
9. Signs of mechanical ventilation impairment
10. Effects of inadequate tidal volume and respiratory rate
    a. Minute ventilation
    b. Alveolar ventilation
11. Hypoxia caused by poor mechanical ventilation

IV. Alteration in Regulation of Respiration Due to Medical or Traumatic Conditions
- A. Chemoreceptors
- B. Stretch receptors
- C. Medulla rhythm centers
- D. Effects of arterial carbon dioxide and oxygen content on respiration rate and depth
- E. Hypoxia caused by respiratory regulation disturbance

V. Ventilation/Perfusion (V/Q) Ratio and Mismatch
- A. Apex of Lung
- B. Base of Lung
- C. Ventilation Disturbance Related to Hypoxemia
- D. Perfusion Disturbance Related to Hypoxemia

VI. Perfusion and Shock
- A. Oxygen
  1. Dissolve in plasma
  2. Attached to hemoglobin
- B. Carbon Dioxide
  1. Dissolved in plasma
  2. Attached to hemoglobin
  3. Bicarbonate
- C. Alveolar/Capillary Gas Exchange
  1. Oxygen
  2. Carbon dioxide
- D. Cell/Capillary Gas Exchange
  1. Oxygen
  2. Carbon dioxide
- E. Cell Hypoxia Related to Oxygen Transport Disturbance
- F. Hypercarbia Related to Carbon Dioxide Transport Disturbance

G. Blood Volume
  1. Composition of blood
    a. Plasma
    b. Red blood cells
    c. White blood cells
    d. Platelets
  2. Distribution
    a. Arteries
    b. Arterioles
    c. Capillaries
    d. Venules
    e. Veins
    f. Heart
    g. Pulmonary veins
  3. Hydrostatic pressure
  4. Plasma oncotic pressure
H. Myocardial Effectiveness
  1. Cardiac output
    a. Heart rate
    b. Stroke volume
      i. preload
      ii. myocardial contractility
      iii. afterload
    c. Impairment of cardiac output
      i. high heart rates
      ii. low hear rates
      iii. low blood volume
      iv. decrease in myocardial contractility
      v. high blood pressure
  2. Influence of autonomic nervous system on cardiac output
    a. Sympathetic
      i. neural
      ii. hormonal
        a) epinephrine
        b) norepinephrine
    b. Parasympathetic
I. Systemic Vascular Resistance (SVR)
  1. Anatomy of the vessel
  2. Influence of autonomic nervous system on SVR
    a. Sympathetic
    b. Parasympathetic
  3. Effects of blood volume and vessel size on pressure inside the vessel

VII. Microcirculation
  A. True Capillaries
  B. Arteriole-Venule Shunt

C. Influence on Capillary
   1. Local
   2. Neural
   3. Hormonal

VIII. Blood Pressure
   A. Cardiac Output
   B. Systemic Vascular Resistance
   C. Baroreceptors
   D. Effects of Changes in Cardiac Output on Blood Pressure
      1. Increase in heart rate
      2. Decrease in heart rate
      3. Increase in stroke volume
      4. Decrease in stroke volume
   E. Effects of Changes in Systemic Vascular Resistance on Blood Pressure
      1. Increase in SVR
      2. Decrease in SVR
   F. Effects of Changes of Blood Pressure on Perfusion of Cells
      1. Oxygen delivery
      2. Glucose delivery

IX. Alteration of Cell Metabolism
   A. Aerobic Metabolism
      1. Glucose
      2. Oxygen
      3. Energy (ATP) released
      4. Byproducts
         a. Carbon dioxide
         b. Water
   B. Anaerobic Metabolism
      1. Glucose
      2. Lack of oxygen
      3. Energy (ATP) released
      4. Byproducts
         a. Lactic acid
         b. Effects of acidic environment on cell structure and function
   C. Effects of Inadequate Perfusion on Cells
      1. Lack of glucose
      2. Lack of oxygen
      3. Lack of energy
         a. Sodium/potassium pump shutdown
         b. Cell membrane rupture
         c. Cell death

Life Span Development

EMT Education Standard

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

EMT-Level Instructional Guideline

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

I. Infancy (Birth to 1 Year)
- A. Physiology
  - 1. Vital signs
    - a. Heart rate
      - i. 100 to 160 beats per minute during first 30 minutes
      - ii. settling around 120 beats per minute
    - b. Respiratory rate
      - i. initially 40-60
      - ii. dropping to 30-40 after first few minutes of life
      - iii. slowing to 20-30 by one year
      - iv. tidal volume
      - v. 6-8 ml/kg initially
      - vi. increasing to 10-15 ml/kg by 1 year
    - c. Blood pressure -- average systolic blood pressure increases from 70 at birth to 90 at 1 year
    - d. Temperature ranges -- 98 to 100 degrees Fahrenheit is the thermoneutral range
  - 2. Weight
    - a. Normally 3.0-3.5 kg at birth
    - b. Normally drops 5 to 10 percent in the first week of life
    - c. Infants head equal to 25 percent of the total body weight
  - 3. Pulmonary system
    - a. Airways, shorter, narrower, less stable, more easily obstructed
    - b. Infants primarily nose breathers until four weeks
    - c. Lung tissue is fragile and prone to trauma from pressure
    - d. Fewer alveoli with decreased collateral ventilation
    - e. Accessory muscles immature, susceptible to early fatigue
    - f. Chest wall less rigid
    - g. Diaphragmatic breathing
    - h. Rapid respiratory rates lead to rapid heat, and fluid loss

4. Immune system
   a. Passive immunity retained through the first six months of life
   b. Based on maternal antibodies
5. Nervous system
   a. Movements
      i. strong, coordinated suck and gag
      ii. well flexed extremities
      iii. extremities move equally when infant is stimulated
   b. Reflexes
   c. Fontanelles
      i. posterior fontanelle closes at three months
      ii. anterior fontanelle closes between 9 and 18 months
      iii. fontanelles may provide an indirect estimate of hydration
6. Growth and development in infants
   a. Rapid changes over first year
      i. two months
         a) tracks objects with eyes
         b) recognizes familiar faces
      ii. six months
         a) sits upright in a highchair
         b) makes one syllable sounds (e.g., ma, mu, da, di)
      iii. 12 months
         a) walks with help
         b) knows own name

B. Psychosocial development
1. Crying
   a. Basic cry
   b. Anger cry
   c. Pain cry
2. Situational crisis – parental separation reactions
   a. Protest
   b. Despair
   c. Withdrawal

II. Toddler (12 to 36 Months) and Preschool Age (3 to 5)
A. Physiological
1. Vital signs
   a. Heart rate
      i. toddlers—80 to 130 beats per minute
      ii. preschoolers—80 to 120 beats per minute
   b. Respiratory rate
      i. toddlers—20 to 30 breaths per minute
      ii. preschoolers—20 to 30 breaths per minute
   c. Systolic blood pressure
      i. toddlers—70 to 100 mmHg
      ii. preschoolers—80 to 110 mmHg
   d. Temperature—96.8 to 99.6 degrees Fahrenheit

2. Pulmonary system
    a. Terminal airways continue to branch
    b. Alveoli increase in number
3. Immune system
    a. Passive immunity lost, more susceptible to minor respiratory and gastrointestinal infections
    b. Develops immunity to common pathogens as exposure occurs
4. Nervous system
    a. Brain 90 percent of adult brain weight
    b. Development allows effortless walking and other basic motor skills
    c. Fine motor skills developing
5. Musculoskeletal system
    a. Muscle mass increases
    b. Bone density increases
6. Elimination patterns
    a. Toilet training
        i. physiologically capable by 12 to 15 months
        ii. psychologically ready between 18 and 30 months
        iii. average age for completion – 28 months

B. Psychosocial
1. Cognitive
    a. Basics of language mastered by approximately 36 months, with continued refinement throughout childhood
    b. Understands cause and effect between 18-24 months
    c. Develops separation anxiety—approximately 18 months
2. Play
    a. Able to play simple games and follow basic rules
    b. Begin to display competitiveness

III. School-Age Children (6 to 12 Years)
A. Physiological
1. Vital signs
    a. Heart rate—70 to 110 beats per minute
    b. Respiratory rate—20 to 30 breaths per minutes
    c. Systolic blood pressure—80 to 120 mmHg
    d. Temperature—98.6 degrees Fahrenheit
2. Bodily functions
    a. Brain function increases in both hemispheres
    b. Loss of primary teeth and replacement with permanent teeth begins

B. Psychosocial
1. Develop self-concept (i.e. more interaction with adults and children
    a. begin comparing themselves with others
    b. develop self-esteem

IV. Adolescence (13 to18 Years)
A. Physiological

1. Vital signs
    a. Heart rate—55 to 105 beats per minute
    b. Respiratory rate—12 to 20 breaths per minute
    c. Blood pressure—100 to 120 mmHg
    d. Temperature—98.6 degrees Fahrenheit
2. Growth rate
    a. Most experience a rapid two- to three-year growth spurt
        i. begins distally with enlargement of feet and hands
        ii. enlargement of the arms and legs follows
        iii. chest and trunk enlarge in final stage
    b. Girls are mostly done growing by age 16, boys are mostly done growing by age 18
    c. Secondary sexual development occurs
    d. Endocrine changes
    e. Reproductive maturity
    f. Muscle mass and bone growth nearly complete

B. Psychological
1. Family
    a. Conflicts arise
2. Develop identity
    a. Self-consciousness increases
    b. Peer pressure increases
    c. Interest in the opposite sex increases
    d. Want to be treated like adults
    e. Anti-social behavior peaks around eighth or ninth grade
    f. Body image of great concern
        i. continual comparison amongst peers
        ii. eating disorders are common
    g. Self-destructive behaviors begin
        i. tobacco
        ii. alcohol
        iii. illicit drugs
    h. Depression and suicide more common than any other age group

V. Early Adulthood (20 to 40 Years)
A. Physiological
1. Vital signs
    a. Heart rate—average 70 beats per minute
    b. Respiratory rate—average 16 to 20 breaths per minutes
    c. Blood pressure—average 120/80 mmHg
    d. Temperature—98.6 degrees Fahrenheit
2. Peak physical conditioning between 19 and 26 years of age
3. Adults develop lifelong habits and routines during this time
4. All body systems at optimal performance
5. Accidents are a leading cause of death in this age group

B. Psychological
   1. Experience highest levels of job stress during this time
   2. Love develops
      a. Romantic love
      b. Affectionate love
   3. Childbirth most common in this age group
   4. This period is less associated with psychological problems related to well being

VI. Middle Adulthood (41 to 60 Years)
A. Physiological
   1. Vital signs
      a. Heart rate—average 70 beats per minute
      b. Respiratory rate—average 16 to 20 breaths per minute
      c. Blood pressure—average 120/80 mmHg
      d. Temperature—98.6 degrees Fahrenheit
   2. Body still functioning at high level with varying degrees of degradation
   3. Vision changes
   4. Hearing less effective
   5. Cardiovascular health becomes a concern
      a. Cardiac output decreases throughout this period
      b. Cholesterol levels increased
   6. Cancer strikes in this age group often
   7. Weight control more difficult
   8. Menopause in women in late 40s early 50s
B. Psychological
   1. Approach problems more as challenges than threats
   2. Empty-nest syndrome
   3. Often burdened by financial commitments for elderly parents as well as young adult children

VII. Late Adulthood (61 Years and Older)
A. Physiological
   1. Vital signs
      a. Heart rate—depends on patient's physical and health status
      b. Respiratory rate—depends on patient's physical and health status
      c. Blood pressure—depends on patient's physical and health status
      d. Temperature—98.6 degrees Fahrenheit
   2. Life span—maximum approximately 120 years
   3. Life expectancy—average length based on year of birth
   4. Cardiovascular function changes
      a. Blood vessels
         i. thickening
         ii. increased peripheral vascular resistance
         iii. reduced blood flow to organs

b. Heart
    i. increased workload
    ii. myocardium is less able to respond to exercise
    iii. tachycardia not well tolerated
c. Blood cells

5. Respiratory system
    a. Changes in mouth, nose, and lungs
    b. Metabolic changes lead to decreased lung function
    c. Muscular changes
        i. diaphragm elasticity diminished
        ii. chest wall weakens
    d. Diffusion through alveoli diminished
    e. Lung capacity diminished
    f. Coughing ineffective
        i. weakened chest wall
        ii. weakened bone structure
6. Endocrine system changes
    a. Decreased glucose metabolism
    b. Decreased insulin production
    c. Reproductive organs atrophy in women
7. Gastrointestinal system
    a. Mouth, teeth, and saliva changes
    b. GI secretions decreased
    c. Vitamin and mineral deficiencies
8. Renal system
    a. 50 percent of nephrons lost
    b. Abnormal glomeruli more common
    c. Decreased elimination
9. Sensory changes
    a. Loss of taste buds
    b. Olfactory diminished
    c. Diminished pain perception
    d. Diminished kinesthetic sense
    e. Visual acuity diminished
    f. Reaction time diminished
    g. Hearing loss
10. Nervous system
    a. Neuron loss
    b. Sleep-wake cycle disrupted

B. Psychological
1. Wisdom attributed to age in some cultures
2. 95 percent of older adults live in communities
3. Challenges
    a. Self-worth
    b. Declining well-being
    c. Financial burdens
    d. Death or dying of companions

Public Health

EMT Education Standard

Uses simple knowledge of the principles of illness and injury prevention in emergency care.

EMT-Level Instructional Guideline

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

I. Basic Principles of Public Health
- A. Role of Public Health
  - 1. Many definitions
  - 2. Public health mission and functions
  - 3. Public health differs from individual patient care
  - 4. Review accomplishments of public health
    - a. Widespread vaccinations
    - b. Clean drinking water and sewage systems
    - c. Declining infectious disease
    - d. Fluoridated water
    - e. Reduction in use of tobacco products
    - f. Prenatal care
    - g. Others
- B. Public Health Laws, Regulations, and Guidelines
- C. EMS Interface With Public Health
  - 1. EMS is a public health system
    - a. EMS provides a critical public health function
    - b. Incorporate public health services into EMS system
    - c. Collaborations with other public health agencies
  - 2. Roles for EMS in public health
    - a. Health prevention and promotion
      - i. primary prevention—preventing disease development
        - a) vaccination
        - b) education
      - ii. secondary prevention—preventing the complications and/or progression of disease
      - iii. health screenings
    - b. Disease surveillance
      - i. EMS providers are first line care givers
      - ii. patient care reports may provide information on epidemics of disease
  - 3. Injury prevention
    - a. Safety equipment

b. Education
   i. car seat safety
   ii. seat belt use
   iii. helmet use
   iv. driving under the influence
   v. falls
   vi. fire
c. Injury surveillance

Pharmacology

Principles of Pharmacology

EMT Education Standard

Applies fundamental knowledge of the medications that the EMT may assist/administer to a patient during an emergency.

EMT-Level Instructional Guideline

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

I. Medication safety

II. Kinds of Medications Used in an Emergency
- A. Forms of Medication
  - 1. Solid
    - a. Pills
    - b. Tablets – compressed powders
    - c. Powder – inhalation
  - 2. Liquids
    - a. Enteral (ingested)
    - b. Parenteral (injected)
  - 3. Gases; aerosols – inhalation
- B. Routes of Medication Administration
  - 1. Enteral (ingested)
    - a. Sublingual (e.g., nitroglycerin)
    - b. Oral (e.g., glucose)
  - 2. Parenteral (injected and inhaled)
    - a. Inhaled (e.g., oxygen)
    - b. Injection (e.g., epinephrine)
    - c. Methods of injection
      - i. subcutaneous
      - ii. intramuscular
      - iii. intravenous

III. Basic Medication Terminology
- A. Drug Name
  - 1. Generic
  - 2. Trade

B. Drug Profile
   1. Actions
      a. Pharmacodynamics – impact of age and weight upon medication administration
      b. Indication
      c. Intended effects
   2. Contraindications
   3. Side effects
      a. Unintended effects
      b. Untoward effects
   4. Dose
   5. Route
C. Prescribing Information

Pharmacology

Medication Administration

EMT Education Standard

Applies fundamental knowledge of the medications that the EMT may assist/administer to a patient during an emergency.

EMT-Level Instructional Guideline

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

I. Assist/Administer Medications to a Patient
   A. Administration versus Assistance of Medications
      1. Assisting patients in taking prescribed medications
      2. Administering medication
      3. Medical Direction
         a. Off-line; standing orders, written protocols
         b. On-line; verbal order
            a) Confirmation – echo technique
            b) Confusion – clarification
   B. Medication Administration Procedure
      1. The "rights" of drug administration
         a. Right patient – prescribed to patient
         b. Right medication – patient condition
         c. Right route – patient condition
         d. Right dose – prescribed to patient
         e. Right time – within expiration date
   C. Techniques of Medication Administration
      1. Oral
         a. Advantages
         b. Disadvantages
         c. Techniques
      2. Sublingual
         a. Advantages
         b. Disadvantages
         c. Techniques
      3. Intramuscular injection by Auto injector
         a. Advantages
         b. Disadvantages
         c. Techniques

4. Inhalation
    a. Advantages
    b. Disadvantages
    c. Techniques

D. Reassessment
    1. Data – indications for medication
    2. Action – medication administered
    3. Response – effect of medication

E. Documentation

Pharmacology

Emergency Medications

EMT Education Standard

Applies fundamental knowledge of the medications that the EMT may assist/administer to a patient during an emergency.

EMT-Level Instructional Guideline

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

The EMT must know the names, mechanism of action, indications, contraindications, complications, routes of administration, side effects, interactions, dose, and any specific administration considerations, for all of the following emergency medications. Individual training programs have the authority to add any medication used locally by EMTs.

I. Specific Medications
   A. EMT – Administer Medications
      1. Aspirin
      2. Oral glucose
      3. Oxygen
   B. EMT – Assisted Medications
      1. Inhaled bronchodilators
      2. Epinephrine
      3. Nitroglycerin

Airway Management, Respiration, and Artificial Ventilation
Airway Management

EMT Education Standard

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

EMT-Level Instructional Guideline

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

I. Airway Anatomy
   A. Upper Airway Tract
      1. Nose – warm and humidify air
      2. Mouth and oral cavity
         a. Alternative airway, especially in emergency
         b. Entrance to the digestive system
         c. Also involved in the production of speech
         d. Tongue
      3. Jaw
      4. Pharynx
         a. Nasopharynx
         b. Oropharynx
         c. Laryngopharyx
      5. Larynx
         a. Epiglottis – muscular structure which protects the airway of conscious patients during swallowing
         b. Vocal cords – thin muscles which are the center for speech and protect the lower airways
         c. Thyroid cartilage
         d. Cricoid ring
   B. Lower Airway Tract
      1. Trachea
         a. Hollow tube which passes air to the lower airways
         b. Supported by cartilage rings
      2. Carina – the bifurcation of the trachea into the two mainstem bronchi
      3. Bronchi
         a. Hollow tubes which further divide into lower airways of the lungs
         b. Supported by cartilage

4. Lungs
    a. Bronchioles
        i. thin hollow tubes leading to the alveoli
        ii. remain open through smooth muscle tone
    b. Alveoli
        i. the end of the airway
        ii. millions of thin walled sacs
        iii. each alveolus surrounded by capillary blood vessels
        iv. site where oxygen and carbon dioxide (waste) are exchanged
    c. Pulmonary capillary beds
        i. blood vessels that begin as capillary surrounding each alveolus
        ii. with adequate blood volume and blood pressure, the vessels return oxygenated blood to the heart

II. Airway Assessment
A. Signs of Adequate Airway
1. Airway is open, can hear/feel air move in and out
2. Patient is speaking in full sentences
3. Sound of the voice is normal for the patient
B. Signs of Inadequate Airway (*Not every sign listed below is present in every patient who has inadequate airway)*
1. Unusual sounds are heard with breathing
    a. stridor
    b. snoring
2. Awake patient is unable to speak or sounds hoarse
3. No air movement (apnea)
4. Airway obstruction
    a. Tongue
    b. Food
    c. Vomit
    d. Blood
    e. Teeth
    f. Foreign body
C. Swelling Due to Trauma or Infection

III. Techniques of Assuring a Patent Airway
A. Manual Airway Maneuvers -- review and elaborate on the manual airway maneuvers used by EMRs
B. Mechanical Airway Devices
1. Review and elaborate on the mechanical airway maneuvers used by EMRs
2. Nasopharyngeal
    a. Purpose
    b. Indications
    c. Contraindications

d. Complications
e. Procedure

C. Relief of Foreign Body Airway Obstruction (refer to current American Heart Association guidelines)

D. Upper Airway Suctioning -- review and elaborate on all material from the EMR Level

IV. Consider Age-Related Variations in Pediatric and Geriatric Patients (see Special Patient Populations Section)

Airway Management, Respiration, and Artificial Ventilation
Respiration

EMT Education Standard

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

EMT-Level Instructional Guideline

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

I. Anatomy of the Respiratory System
   - A. Includes All Airway Anatomy Covered in the Airway Management Section
   - B. Additional Respiratory System Anatomy
     - 1. Chest cage
     - 2. Ribs
     - 3. Muscles
       - a. Intercostal
       - b. diaphragm
     - 4. Pleura
     - 5. Phrenic nerve innervation
   - C. Vascular Structures Which Support Respiration
     - 1. Pulmonary capillary structures
     - 2. The heart
       - a. Right heart
         - i. receives systemic circulation
         - ii. drives pulmonary circulation
       - b. Left heart
         - i. receives pulmonary circulation
         - ii. drives systemic circulation
       - c. Automaticity
     - 3. Arteries, arterioles, capillaries, venules, veins
     - 4. Tissue/cellular beds
   - D. Cells
     - 1. All cells perform a specific function
     - 2. Cells require chemicals in order to function, including oxygen, glucose, and electrolytes
       - a. Cells must excrete waste products, including carbon dioxide and water
       - b. Aerobic versus anaerobic respiration

3. Respiratory regulation – influenced by carbon dioxide and oxygen levels in the blood and spinal fluid
4. Respiration; pulmonary ventilation – the movement of air in and out of the lungs
    a. External respiration – the exchange of respiratory gases between the alveoli and the pulmonary capillary bed
    b. Internal respiration – the exchange of respiratory gases between the systemic capillaries and their surrounding tissue beds
    c. Cellular respiration and metabolism – the use of oxygen and carbohydrates to produce energy and the creation of carbon dioxide and water as a by-product of metabolism

II. Physiology of Respiration
A. Pulmonary Ventilation
1. Ventilation is the movement of air in and out of the lungs
2. Adequate ventilation is necessary for, but does not assure, adequate respiration
3. The mechanics of ventilation
    a. Inhalation
    b. Exhalation
4. Alveolar Ventilation
    a. Tidal volume
    b. Dead space
    c. Vital capacity
    d. Respiratory Rate
    e. Minute volume
    f. Residual volume

B. Oxygenation
1. Oxygenation is the process of loading oxygen molecules onto hemoglobin molecules in the bloodstream
2. Oxygenation is required for, but does not assure, internal respiration

C. Respiration
1. Respiration is the exchange of oxygen and carbon dioxide and is essential for life
    a. External respiration – exchange of oxygen and carbon dioxide between the alveoli and the blood in the pulmonary capillaries
    b. Internal respiration – exchange of oxygen and carbon dioxide between the capillaries of the body tissues and the individual cells
    c. Cellular respiration
        i. each cell of the body performs a specific function
        ii. oxygen and sugar are essential to produce energy for cells to perform their function
        iii. produce carbon dioxide as a waste product

2. Adequate ventilation is required for, but does not assure, external respiration
3. Adequate external ventilation and perfusion are required for, but do not assure, internal respiration

III. Pathophysiology of Respiration
- A. Pulmonary Ventilation
  1. Interruption of nervous control
     - a. Drugs
     - b. Trauma
     - c. Muscular dystrophy
  2. Structural damage to the thorax
  3. Bronchoconstriction
  4. Disruption of airway patency
     - a. Infection
     - b. Trauma/burns
     - c. Foreign body obstruction
     - d. Allergic reactions
     - e. Unconsciousness (loss of muscle tone)
- B. Oxygenation
- C. Respiration
  1. External
     - a. Altitude
     - b. Closed environments
     - c. Toxic or poisonous environments
  2. Internal
     - a. Pathology typically related to changes in alveolar – capillary gas exchange
     - b. Typical disease processes
       - i. emphysema
       - ii. pulmonary edema
       - iii. pneumonia
       - iv. environmental/occupational exposure
       - v. drowning
  3. Cellular
- D. Circulation compromise
  1. Pathology typically related to derangement of pulmonary and systemic perfusion and oxygenation
  2. Typical disease processes
     - a. Obstruction of blood flow
       - i. pulmonary embolism
       - ii. tension pneumothorax
       - iii. heart failure
       - iv. cardiac tamponade
     - b. Anemia
     - c. Hypovolemia
     - d. Vasodilatory shock

E. Cells
    1. Hypoxia
    2. Hypoglycemia
    3. Infection

IV. Assessment of Adequate and Inadequate Ventilation
A. Internal Respiration is Necessary for Life
B. It Is Sometimes Difficult to Assess Internal Respiration
C. It May Be Difficult to Determine If You Have a Respiration, Ventilation, or Oxygenation Problem as They May Coexist and One Can Cause Another
D. Assessment of Ventilation
    1. Signs of adequate ventilation
        a. Respiratory rate is normal
        b. Breath sounds are clear on both sides of the chest
            i. anterior
            ii. posterior
        c. Tidal volume
        d. Minute volume
    2. Signs of inadequate ventilation (*not every sign listed below is present in every patient who has inadequate ventilation and/or oxygenation)*
        a. Abnormal work of breathing
            i. retractions
            ii. nasal flaring
            iii. abdominal breathing
            iv. diaphoresis
        b. Abnormal breath sounds
            i. stridor
            ii. wheezing
            iii. crackles
            iv. silent chest
            v. breath sounds are unequal
                a) trauma
                b) infection
                c) pneumothorax
        c. Minute volume (respiratory rate x tidal volume)
        d. Chest wall movement or damage
            i. trauma
                a) paradoxical
                b) splinting
                c) penetrating
        e. Irregular respiratory pattern
            i. head trauma
            ii. stroke
            iii. metabolic
            iv. toxic
            v. rapid respiratory rate without clinical improvement
E. Assessment of Respiration

1. Ambient air is abnormal
    a. Enclosed space
    b. High altitude
    c. Poison gas
2. Level of consciousness
3. Skin color/mucosa is not normal
    a. Cyanosis – etiology
    b. Pallor – etiology
    c. Mottling – etiology
4. Assessment of oxygenation
    a. Mental status
        i. baseline
    b. Skin color normal
    c. Oral mucosa normal
    d. Pulse oximeter reading within acceptable level
    e. Pulse oximetry
        i. purpose
            a) assesses oxygenation
            b) quantify hemoglobin saturation
            c) assess adequacy of oxygen delivery during positive pressure ventilation
            d) assess impact of interventions
        ii. indications – routine vital sign
        iii. contraindications
        iv. complications
            a) hypoperfusion
            b) carbon monoxide
            c) cold extremity
            d) time lag in detection of respiratory insufficiency
        v. procedure
            a) refer to the manufacturer's instructions for the device being used
            b) considered alternative measurement sites

V. Management of Adequate and Inadequate Respiration
    A. Assure an Adequate Airway
    B. Supplemental Oxygen Therapy
        1. Ambient air is
            a. Oxygen
            b. Nitrogen
            c. Carbon dioxide
        2. Supplemental oxygen therapy replaces some of the inert gas with oxygen and can improve internal respiration

3. Oxygen sources
    a. Portable oxygen cylinder
        i. cylinder size
        ii. assembly and use of cylinders
        iii. changing a cylinder
            a) safe residual for operation is 200 psi
            b) calculating cylinder duration
        iv. securing and handling cylinders
    b. Liquid oxygen
4. Oxygen delivery devices
    a. Nasal cannula
        i. purpose
        ii. indications
        iii. contraindications
        iv. complications
        v. procedure
    b. Partial re-breather face mask
        i. purpose
        ii. indications
        iii. contraindications
        iv. complications
        v. procedure
    c. Non-rebreather
        i. purpose
        ii. indications
        iii. contraindications
        iv. complications
        v. procedure
    d. tracheostomy mask
        i. purpose
        ii. indications
        iii. contraindications
        iv. complications
        v. procedure
    e. Venturi mask
        i. purpose
        ii. indications
        iii. contraindications
        iv. complications
        v. procedure
    f. Humidifiers
        i. purpose
        ii. indications
        iii. contraindications
        iv. complications
        v. procedure

C. Assisting Ventilation in Respiratory Distress/Failure
   1. Purpose
      a. To improve oxygenation
      b. To improve ventilation
   2. Indications
      a. Shows signs and symptoms of inadequate ventilation
         i. altered mental status
         ii. inadequate minute ventilation
         iii. fatigue from work of breathing
         iv. others
   3. Complications
      a. Combative/hypoxic patients
      b. Inadequate mask seal
      c. Over pressure causing injury to the lung
      d. Risk of gastric inflation and vomiting
   4. Procedure
      a. Explain the procedure to the patient
      b. Place the mask over the patient's nose and mouth
      c. Initially assist at the rate at which the patient has been breathing
      d. Squeeze the bag each time the patient begins to inhale
      e. Over the next 5-10 breaths
         i. slowly adjust the rate and the delivered tidal volume
         ii. appropriate rate and volume are determined by minute ventilation

VI. Consider Age-Related Variations in Pediatric and Geriatric Patients (see Special Patient Populations)

Airway Management, Respiration, and Artificial Ventilation
Artificial Ventilation

EMT Education Standard

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

EMT-Level Instructional Guideline

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

I. The Management of Inadequate Ventilation
   - A. Assure an Adequate Airway
   - B. Supplemental Oxygen Therapy
   - C. Artificial Ventilation Devices
     - 1. Bag-valve-mask with reservoir
       - a. Advantages
       - b. Disadvantages
     - 2. Manually triggered ventilation device
       - a. Advantages
         - i. allows for a single rescuer to use both hands to maintain a mask-to-face seal while providing positive pressure ventilation to a patient
         - ii. reduces rescuer fatigue during extended transport times
       - b. Disadvantages
         - i. difficult to maintain adequate ventilation without assistance
         - ii. requires oxygen however, typical adult ventilation consumes 5 liters per minute O_2 versus 15-25 liters per minute for a bag-valve-mask
         - iii. typically used on adult patients only
         - iv. requires special unit and additional training for use in pediatric patients
         - v. the rescuer is unable to easily assess lung compliance
         - vi. high ventilatory pressures may damage lung tissue
     - 3. Automatic Transport Ventilator/Resuscitator
       - a. Advantages
       - b. Disadvantages
         - i. requires oxygen, however typical adult ventilation consumes 5 liters per minute 0_2 versus 15-25 liters per minute for a bag-valve-mask
         - ii. may require an external power source

iii. must have bag-valve-mask device available
iv. may interfere with timing of chest compressions during CPR
v. must monitor to assure full exhalation
vi. barotrauma

D. Ventilation of an Apneic Patient
1. Purpose
2. Indications
3. Contraindications
4. Procedure

E. Ventilation of the Protected Airway
1. Purpose
2. Indications
3. Contraindications
4. Complications
5. Procedure

II. The Differences Between Normal and Positive Pressure Ventilation

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

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

C. Airway Wall Pressure
1. Normal ventilation
2. Positive pressure ventilation
a. Walls are pushed out of normal anatomical shape
b. More volume is required to have the same effect as normal breathing

D. Esophageal Opening Pressure
1. Normal ventilation
2. Positive pressure ventilation
a. Air is pushed into the stomach during ventilation
b. Gastric distention may lead to vomiting
3. Sellick's maneuver (cricoid pressure)
a. Use during positive pressure ventilation
b. Reduces amount of air in stomach

c. Procedure
    i. identify cricoid cartilage
    ii. apply firm backward pressure to cricoid cartilage with thumb and index finger
d. Do not use if
    i. patient is vomiting or starts to vomit
    ii. patient is responsive
    iii. breathing tube has been placed by advanced level providers

E. Over Ventilation (Either by Rate or Volume) Can Be Detrimental to the Patient
1. Positive pressure ventilation may cause
    a. Hypotension
    b. Gastric distention
    c. Other unintended consequences

III. Consider Age-Related Variations in Pediatric and Geriatric Patients (see Special Patient Considerations)

Patient Assessment

Scene Size-Up

EMT Education Standard

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

EMT-Level Instructional Guideline

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

I. Scene Safety
- A. Common Scene Hazards
  - 1. Environmental
  - 2. Hazardous substances
    - a. Chemical
    - b. Biological
  - 3. Violence
    - a. Patient
    - b. Bystanders
    - c. Crime scenes
  - 4. Rescue
    - a. Motor vehicle collisions
      - i. extrication hazards
      - ii. roadway operation dangers
    - b. Special situations
- B. Evaluation of the Scene -- is the scene safe?
  - 1. Yes -- establish patient contact and proceed with patient assessment.
  - 2. No -- is it possible to quickly make the scene safe?
    - a. Yes -- assess patient
    - b. No -- do not enter any unsafe scene until minimizing hazards
  - 3. Request specialized resources immediately

II. Scene Management
- A. Impact of the Environment on Patient Care
  - 1. Medical
    - a. Determine nature of illness
    - b. Hazards at medical emergencies
  - 2. Trauma
    - a. Determine mechanism of injury
    - b. Hazards at the trauma scene

3. Environmental considerations
    a. Weather or extreme temperatures
    b. Toxins and gases
    c. Secondary collapse and falls
    d. Unstable conditions

B. Addressing Hazards
1. Protect the patient
    a. After making the scene safe for the EMT, the safety of the patient becomes the next priority
    b. If the EMT cannot alleviate the conditions that represent a health or safety threat to the patient, move the patient to a safer environment
2. Protect the bystanders
    a. Minimize conditions that represent a hazard for bystanders
    b. If the EMT cannot minimize hazards, remove bystanders from the scene
3. Request resources
    a. Multiple patients – additional ambulances
    b. Fire hazard – fire department
    c. Traffic or violence issues – law enforcement
4. Scan the scene for information related to
    a. Mechanism of injury
    b. Nature of the illness

C. Violence
1. EMTs should not enter a scene or approach a patient if the threat of violence exits
2. Park away from the scene and wait for the appropriate law enforcement officials to minimize the danger

D. Need for Additional or Specialized Resources
1. A variety of specialized protective equipment and gear is available for specialized situations
    a. Chemical and biological suits can provide protection against hazardous materials and biological threats of varying degrees
    b. Specialized rescue equipment may be necessary for difficult or complicated extrications
    c. Ascent or descent gear may be necessary for specialized rescue situations
2. Only specially trained responders should wear or use the specialized equipment

E. Standard Precautions
1. Overview
    a. Based on the principle that all blood, body fluids, secretions, excretions (except sweat), non-intact skin, and mucous membranes may contain transmissible infectious agents
    b. Include a group of infection prevention practices that apply to all patients, regardless of suspected or confirmed infection status, in any healthcare delivery setting

c. Universal precautions were developed for protection of healthcare personnel
d. Standard precautions focus on protection of patients

2. Implementation
   a. The extent of standard precautions used is determined by the anticipated blood, body fluid, or pathogen exposure
      i. hand washing
      ii. gloves
      iii. gowns
      iv. masks
      v. protective eyewear
3. Personal Protective Equipment
   a. Personal protective equipment includes clothing or specialized equipment that provides some protection to the wearer from substances that may pose a health or safety risk
   b. Wear PPE appropriate for the potential hazard
      i. steel-toe boots
      ii. helmets
      iii. heat-resistant outerwear
      iv. self-contained breathing apparatus
      v. leather gloves

F. Multiple-Patient Situations
1. Number of patients and need for additional support
   a. How many patients?
   b. Does the dispatch suggest the need for additional support?
   c. Protection of the patient
      i. weather or extreme temperatures
      ii. unstable conditions
   d. Protection of bystanders
      i. remove
      ii. isolate
      iii. barricade
2. Need for additional resources
   a. Incident Command System (ICS or IMS)
   b. Consider if this level of commitment is required

Patient Assessment

Primary Assessment

EMT Education Standard

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

EMT-Level Instructional Guideline

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

I. Primary Survey/Primary Assessment
   A. Initial General Impression – Based on the Patient's Age-Appropriate Appearance
      1. Appears stable
      2. Appears stable but potentially unstable
      3. Appears unstable
   B. Level of Consciousness
      1. While approaching the patient or immediately upon patient contact attempt to establish level of consciousness
         a. Speak to the patient and determine the level of response
         b. EMT should identify himself or herself
         c. EMT should explain that he or she is there to help
      2. Patient response
         a. Alert
            i. the patient appears to be awake
            ii. the patient acknowledges the presence of the EMT
         b. Responds to verbal stimuli
            i. the patient opens his/her eyes in respond to the EMT's voice
            ii. the patient responds appropriately to a simple command
         c. Responds to painful stimuli
            i. the patient neither acknowledges the presence of the EMT nor responds to loud voice
            ii. patient responds only when the EMT applies some form of irritating stimulus
               a) when an irritating stimulus is encountered, the human body will either attempt to move away from the stimulus or will attempt to move the stimulus away from the body
               b) acceptable stimuli
                  i) pinch the patient's ear

ii) trapezius squeeze
iii) others

d. Unresponsive – the patient does not respond to any stimulus

C. Airway Status

1. Unresponsive patient
   a. Medical patients
      i. open and maintain the airway with head-tilt, chin-lift technique
      ii. see the current American Heart Association guidelines for the steps in performing this procedure for victims of all ages
   b. Trauma patients
      i. open and maintain the airway with modified jaw thrust technique while maintaining manual cervical stabilization
      ii. see the current American Heart Association guidelines for the steps in performing this procedure for victims of all ages
2. Responsive patient
   a. If the patient speaks, the airway is functional but may still be at risk -- foreign body or substances in the mouth may impair the airway and must be removed
      i. finger sweep (solid objects)
      ii. suction (liquids)
   b. If the upper airway becomes narrowed, inspiration may produce a high-pitched whistling sound known as stridor
      i. foreign body
      ii. swelling
      iii. trauma
   c. Airway patency must be continually reassessed

D. Breathing Status

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

E. Circulatory Status

1. Radial pulse present (rate and quality)
   a. Normal rate
   b. Fast
   c. Slow
   d. Irregular rate
2. Radial pulse absent
3. Assess if major bleeding is present

4. Perfusion status
    a. Skin color
    b. Skin temperature
    c. Skin moisture
    d. Capillary refill (as appropriate)

F. Identifying Life Threats
1. Assess patient and determine if the patient has a life-threatening condition
    a. Unstable – if a life threatening condition is found, treat immediately
    b. Stable – assess nature of illness or mechanism of injury

G. Assessment of Vital Functions

II. Integration of Treatment/Procedures Needed to Preserve Life

III. Evaluating Priority of Patient Care and Transport
A. Primary Assessment: Stable
B. Primary Assessment: Potentially Unstable
C. Primary Assessment: Unstable

Patient Assessment

History-Taking

EMT Education Standard

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

EMT-Level Instructional Guideline

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

I. Investigation of the Chief Complaint
   A. The Chief Complaint Is a Very Brief Description of the Reason for Summoning EMS to the Scene
   B. Factors Influencing the Data Collection
      1. What is the source of the information?
         a. Patient
            i. usually the best source for information
         b. Family
         c. Friends
         d. Bystanders
         e. Public safety personnel
         f. Medical identification jewelry or other medical information sources
      2. How reliable is the data?
   C. History of the Present Illness
      1. Detailed evaluation of the chief complaint
      2. Provides a full, clear, chronological account of the signs and symptoms

II. Components of a Patient History
   A. Statistical and Demographic
      1. Obtain correct dates
      2. Accurately document all times
      3. Identifying data
         a. Age
         b. Sex
         c. Race
   B. Past Medical History (Pertinent to the Medical Event)
      1. Medical
      2. Trauma
      3. Surgical
      4. Consider medical identification tag

C. Current Health Status (Pertinent to the Medical Event)
    1. Focuses on present state of health
    2. Environmental conditions
    3. Individual factors
        a. Current medications
        b. Allergies
        c. Tobacco use
        d. Alcohol, drugs and related substances
        e. Diet
        f. Screening tests
        g. Immunizations
        h. Environmental hazards
        i. Use of safety measures (in and out of the home)
        j. Family history

III. Techniques of History Taking
A. Setting the Stage
    1. Environment – personal space
    2. EMS personnel demeanor and appearance
        a. Be aware of body language
        b. Clean, neat, and professional
    3. Note-taking
        a. Difficult to remember all details
        b. Most patients comfortable with note-taking
B. Learning About the Present Illness
    1. Refer to the patient by name
        a. Refer to the patient by their last name with the proper title
            i. Mr., Mrs., or Ms.
            ii. if they inform you to address them by their first name, do so
        b. Avoid the use of unfamiliar or demeaning terms such as “granny” or “honey”
C. Determine Chief Complaint
    1. Use a general, open-ended question
    2. Follow the patient’s lead
        a. Facilitation
            i. posture, actions, or words should encourage the patient to say more
            ii. making eye contact or saying phrases such as “go on” or “I’m listening” may help the patient to continue
        b. Reflection
            i. repeating the patient’s words encourages additional responses
            ii. typically does not bias the story or interrupt the patient’s train of thought
        c. Clarification – used to clarify ambiguous statements or words

d. Empathetic responses – use techniques of therapeutic communication to interpret feelings and your response
e. Confrontation – some issues or responses may require you to confront patients about their feelings
f. Interpretation – goes beyond confrontation, requires you to make an inference

D. History of the Present Illness
1. Location (where is it?)
2. Onset (when did it start?)
3. Provocative, palliative, and positioning
a. What makes it worse?
b. What makes it better?
c. What position is the patient comfortable?
4. Quality (what is it like?)
5. Radiation (does it move anywhere?)
6. Severity
a. Attempt to quantify the pain
b. Utilize the scale, 1-10
7. Time
a. Duration
b. When did it start?
c. How long does it last?
8. Associated signs and symptoms
9. Pertinent negative(s)
10. For trauma patients, determine the mechanism of injury

E. Assess Past Medical History (Pertinent to the Medical Event)
1. Pre-existing medical conditions or surgeries
2. Medications
3. Allergies
4. Family history
5. Social history; travel history

F. Current Health Status
1. Tobacco use
2. Use of alcohol, drugs, and other related substances
3. Diet

IV. Standardized Approach to History-Taking
A. SAMPLE History
1. S = Signs and symptoms
2. A = Allergies
a. Medication
b. Environmental
3. M = Medications
a. Over the counter (OTC)
b. Prescribed
c. Vitamins and herbal
d. Birth control / erectile dysfunction

e. Other people's medications
f. Recreational drugs

4. P = Past pertinent medical history – relevant information concerning the illness or injury
5. L = Last oral intake
   a. Fluids
   b. Food
   c. Other substances
6. E = Events leading to the illness or injury
   a. What was taking place just prior to the illness or injury?

B. OPQRST History
1. O = Onset – time the signs or symptoms started
2. P = Provocative, palliative, and positioning
   a. What makes it worse?
   b. What makes it better?
   c. Positioning
      i. in what position is the patient found?
      ii. should the patient remain in that position?
3. Q = Quality of the discomfort
   a. Patient's ability to describe the type of discomfort
      i. burning
      ii. stabbing
      iii. crushing
4. R = Radiation
   a. Does the discomfort move in any direction?
5. S = Severity
   a. Pain scale
6. T = Time
   a. Relating to onset, however, more definitive in regards to initial onset in the history

V. Taking History on Sensitive Topics
A. Alcohol and Drugs
B. Physical Abuse or Violence
C. Sexual History
D. Special Challenges
1. Silent patient
   a. Silence is often uncomfortable
   b. Be alert for nonverbal clues of distress
   c. Silence may be the result of the interviewer's lack of sensitivity
2. Overly talkative patients
   a. Give the patient free reign for the first several minutes
   b. Summarize frequently
3. Patient with multiple symptoms

4. Anxious patient
   a. Anxiety is natural

b. Be sensitive to nonverbal clues
c. Reassurance

5. Angry and hostile patient
   a. Understand that anger and hostility are natural
   b. Often the anger is displaced toward the clinician
   c. Do not get angry in return
6. Intoxicated patient
   a. Be accepting, not challenging
   b. Do not attempt to have the patient lower their voice or stop cursing; this may aggravate them
   c. Avoid trapping them in small areas
   d. Treat with dignity, despite their intoxication
7. Crying patient may provide valuable insight
8. Depressed patient
   a. Be alert for signs of depression
   b. Be willing to listen and be non-judgmental
9. Patient with confusing behavior or history
10. Patient with limited cognitive abilities
    a. Do not overlook the ability of these patients to provide you with adequate information
    b. Be alert for omissions
11. EMT-patient language barrier – take every possible step to find a translator
12. Patient with hearing problem – if the patient can write, have the patient write down questions and answers on paper
13. Patient with visual impairment – be careful to announce presence and provide careful explanations
14. Talking with family and friends
    a. Some patients may not be able to provide you with all information
    b. Try to find a third party who can help you get the whole story

VI. Age-Related Variations for Pediatric and Geriatric Assessment and Management
   A. Pediatric (see Special Patient Population section)
   B. Geriatric (see Special Patient Population section)
      1. Obtain eye glasses and hearing aids
      2. Expect history to take more time

Patient Assessment

Secondary Assessment

EMT Education Standard

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

EMT-Level Instructional Guideline

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

I. Techniques of Physical Examination
   A. General Approach
      1. Examine the patient systematically
      2. Place special emphasis on areas suggested by the present illness and chief complaint
      3. Keep in mind that most patients view a physical exam with apprehension and anxiety—they feel vulnerable and exposed
      4. Maintain professionalism throughout the physical exam while displaying compassion towards your patient
   B. Respiratory System
      1. Expose the chest as appropriate for the environment
      2. Chest shape and symmetry
      3. Respiratory effort
         a. Accessory muscle use
         b. Retractions
      4. Auscultation
         a. Technique – medical versus trauma
         b. Presence of breath sounds
         c. Absence of breath sounds
   C. Cardiovascular System
      1. Pulse
         a. Rate
         b. Rhythm
         c. Predictable
         d. Adjust timing for irregularity
         e. Strength
         f. Location
            i. common locations
            ii. pelation to perfusion

2. Perfusion
    a. Blood pressure
        i. equipment size
        ii. placement of cuff
        iii. position of patient
        iv. position of arm
        v. methods of measurement
            a) auscultation
            b) palpation
        vi. relation to perfusion

D. Neurological System
1. Mental status
    a. Appearance and behavior
        i. assess for level of consciousness (AVPU)
            a) alert
            b) response to verbal stimuli
                i) drowsiness
                ii) stupor
                (a) state of lethargy
                (b) person seems unaware of surroundings
            c) response to painful stimuli
            d) unresponsive
                i) coma
                (a) state of profound unconsciousness
                (b) absence of spontaneous eye movements
                (c) no response to verbal or painful stimuli
                (d) patient cannot be aroused by any stimuli
        ii. observe posture and motor behavior
        iii. facial expression
            a) anxiety
            b) depression
            c) anger
            d) fear
            e) sadness
            f) pain
    b. Speech and language
        i. rate
        ii. appropriateness
            a) slurred
            b) garbled
            c) aphasia

c. Mood
    i. nature
    ii. intensity
    iii. suicidal ideation
d. Thought and perceptions
    i. assess thought processes
        a) logic
        b) organization
    ii. assess thought content
        a) unusual thoughts
        b) unpleasant thoughts
    iii. assess perceptions
        a) unusual
        b) hearing things
        c) seeing things
e. Memory and attention
    i. person
    ii. place
    iii. time
    iv. purpose

E. Musculoskeletal System
1. Pelvic region
    a. Symmetry
    b. Tenderness
2. Lower extremities
    a. Overview
        i. symmetry
        ii. surface findings
    b. General physical findings
        i. range of motion
        ii. sensory
        iii. motor function
        iv. circulatory function
    c. Peripheral vascular system
        i. tenderness
        ii. temperature of lower legs
        iii. distal pulses
3. Upper extremities
    a. Overview
        i. symmetry
        ii. strength
        iii. surface findings
    b. General physical findings
        i. range of motion
        ii. sensory
        iii. motor function
        iv. circulatory function

v. arm drift

4. Back
   a. Overview
      i. symmetry
      ii. contour
      iii. surface findings
   b. General physical findings
      i. flank tenderness
      ii. spinal column tenderness

F. All Anatomical Regions
   1. Head
      a. Scalp
      b. Skull
      c. Face
         i. symmetry of expression
         ii. appropriate facial expression
      d. Eyes
         i. pupil size, shape, and response
            a) normal – equal and reactive to light
            b) abnormal
               i) constricted
               ii) dilated
               iii) unequal
         ii. conjunctiva color and hydration
      e. Ears – fluids
      f. Nose
         i. symmetry
         ii. fluid in nares
      g. Mouth and pharynx
         i. odor
         ii. hydration
         iii. condition of teeth
   2. Neck
      a. Physical findings
      b. Symmetry
      c. Masses
      d. Arterial pulses
   3. Chest
      a. Overview
         i. expose appropriately
         ii. chest shape and symmetry
         iii. respiratory effort
         iv. surface findings – inspection
      b. Auscultation
         i. technique – medical versus trauma
         ii. lung sounds
            a) presence of breath sounds – wheezes

b) absence of breath sounds

c. Anterior chest

i. auscultation findings – lungs

ii. intercostal muscle use

iii. retraction

d. Posterior chest

i. auscultation

ii. spinal column

4. Abdomen

a. Overview

i. position patient for examination

ii. shape and size

iii. palpation method

a) four quadrants

b) palpate affected area last

b. Physical findings

i. symmetry

ii. masses

iii. organ margins

iv. contour

v. softness

vi. tenderness

vii. findings associated with pregnancy – physical changes of contour and shape

II. Special Considerations for Pediatric and Geriatric Patients (see Special Patient Populations section)

Patient Assessment

Monitoring Devices

EMT Education Standard

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

EMT-Level Instructional Guideline

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

I. Pulse Oximetry
   - A. Purpose
     - 1. Assess oxygenation
     - 2. Assess adequacy of oxygen delivery during positive pressure ventilation
     - 3. Assess impact of interventions
   - B. Indications
   - C. Procedure
     - 1. Refer to the manufacturer's instructions for the specific device being used
     - 2. Considered alternative measurement sites
   - D. Limitations
     - 1. General
       - a. Appropriateness of use
       - b. Does not provide a direct measurement of blood oxygen content
       - c. Does not indicate whether body cells can utilize the oxygen present
     - 2. Specific
       - a. Hypoperfusion
       - b. Carbon monoxide
       - c. Cold extremity
       - d. Time lag in detection of respiratory insufficiency

II. Non-Invasive Blood Pressure
   - A. Purpose
     - 1. Obtaining blood pressure after manual blood pressure
   - B. Indication
     - 1. Routine vital sign
     - 2. Continuous monitoring of patient
   - C. Procedure
     - 1. Refer to the manufacturer's instructions for the specific device being used
   - D. Limitations
     - 1. Erroneous readings or values

III. Other Monitoring Devices

A. As Additional Monitoring Devices Become Recognized as the "Standard of Care" in the Out-of-Hospital Setting, Those Devices Should Be Incorporated Into the Primary Education of Those Who Will Be Expected to Use Them in Practice

B. State regulatory processes may elect to expand, delete, or modify the monitor devices in this section

Patient Assessment

Reassessment

EMT Education Standard

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

EMT-Level Instructional Guideline

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

I. How and When to Reassess

II. Identify and Treat Changes in the Patient's Condition in a Timely Manner
   - A. Monitor the patient's condition
   - B. Monitor the effectiveness of interventions
   - C. Identify trends in the patients vital signs

III. Reassessments Should Be Performed at Regular Intervals
   - A. Unstable Patients – Every Five Minutes, or as Often as Practical Depending on the Patient's Condition
   - B. Stable Patients – At Least Every 15 Minutes or as Deemed Appropriate by the Patient's Condition

IV. A Reassessment Includes:
   - A. Primary Assessment
   - B. Vital Signs
   - C. Chief Complaint
   - D. Interventions

V. Compare to the Baseline Status of That Component
   - A. Level of Consciousness – Is the Patient Maintaining the Same Level of Responsiveness or Becoming More/Less Alert?
   - B. Airway – Recheck the Airway for Patency
   - C. Breathing – Reassess the Adequacy of Breathing by Monitoring Both Breathing Rate and Tidal Volume
   - D. Circulation – Reassess the Adequacy of Circulation by Checking Both Central and Peripheral Pulses

VI. Vital Signs
   A. Repeat Vital Signs as Necessary
   B. Attention Should Be Paid to:
      1. Respirations
      2. Pulse
      3. Blood pressure
      4. Pupils

VII. Chief Complaint
   A. Constantly Reassess the Patient's Chief Complaint or Major Injury
   B. Determine If Their Pain/Discomfort Is Remaining the Same, Getting Worse, or Getting Better
   C. Be Sure to Ask If There Are Any New or Previously Undisclosed Complaints

VIII. Interventions – Reassess the Effectiveness of Each Intervention Performed and Consider the Need for New Interventions or Modifications to Care Already Being Provided

IX. Age-Related Considerations for Pediatric and Geriatric Assessment and Management

Medicine
Medical Overview

EMT Education Standard

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

EMT-Level Instructional Guideline

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

I. Assessment Factors
   - A. Scene Safety
   - B. Environment
   - C. Chief Complaint
     1. Primary reason for EMS response
     2. Verbal or non-verbal
     3. Possibly misleading
   - D. Life-Threatening Conditions
   - E. Non-Life Threatening Conditions
   - F. Distracting Injuries
   - G. Tunnel Vision
   - H. Patient Cooperation
   - I. EMT Attitude
     1. Biases
     2. Labeling

II. Major Components of the Patient assessment
   - A. Standard Precautions
   - B. Scene Size-Up
   - C. General Impression
   - D. Initial Assessment
   - E. SAMPLE History
     1. Importance of a Thorough History
        - a. Primary component of the overall assessment of the medical patient
        - b. Requires a balance of knowledge and skill to obtain a thorough and accurate history
        - c. Helps to ensure the proper care will be provided for the patient
     2. Unresponsive patient
        - a. Pill containers
        - b. Medical jewelry

c. Family members
d. Bystanders
e. Medical devices

3. Responsive patient
   a. Obtained directly from the patient
   b. Focused on the patient's chief complaint
   c. Additional history may be obtained from evidence at the scene
      i. pill containers
      ii. medical jewelry
      iii. family members
      iv. bystanders
4. OPQRST mnemonic for evaluation of pain
   a. O – onset
      i. focuses on what the patient was doing when the problem began
      ii. question: what were you doing when the problem began?
   b. P – provoke
      i. focuses on what might provoke the problem for the patient
      ii. question: does anything you do make the problem better or worse?
   c. Q – quality
      i. focuses on the patient's own description of the problem
      ii. questions
         a) Can you describe your pain/discomfort?
         b) What does if feel like?
         c) Is it sharp? Dull?
         d) Is it steady or does it come and go?
   d. R - region/radiate
      i. focuses on the specific area of the pain/discomfort
      ii. questions
         a) Can you point with one finger where you fee the pain/discomfort the most?
         b) Does the pain/discomfort radiate to any other areas of your body?
   e. S – severity
      i. focuses on the severity of the pain/discomfort
      ii. questions
         a) Use a pain scale to ask the patient: How would you rate your pain right now?
         b) How would you rate your pain when it first began?
         c) Has there been any change since it first began?
   f. T – time
      i. focuses on the duration of the problem/pain/discomfort
      ii. question: when did your problem/pain/discomfort first begin?

F. Baseline Vital Signs
G. Secondary Assessment

1. May not be appropriate to perform a complete secondary assessment on all medical patients
2. Designed to identify any signs or symptoms of illness that may not have been revealed during the initial assessment
    a. Head/scalp
        i. pain
        ii. symmetry
    b. Face
        i. pain
        ii. symmetry of facial muscles
    c. Eyes
        i. pupil size
        ii. equality and reactivity to light
        iii. pink moist conjunctiva
    d. Ears
        i. pain
        ii. drainage
    e. Nose
        i. pain
        ii. nasal flaring
    f. Mouth
        i. foreign body
        ii. loose dentures
        iii. pink and moist mucosa
    g. Neck
        i. pain
        ii. accessory muscle use
        iii. jugular vein distention
        iv. medical jewelry
        v. stoma
    h. Chest
        i. pain
        ii. equal rise and fall
        iii. guarding
        iv. breath sounds
        v. retractions
        vi. scars
        vii. medication patches
        viii. medical devices
    i. Abdomen
        i. pain
        ii. rigidity
        iii. distention
        iv. scars
        v. medical devices

j. Pelvis/genital
    i. pain
    ii. incontinence
k. Arms
    i. pain
    ii. distal circulation
    iii. sensation
    iv. motor function
    v. track marks
    vi. medical jewelry
l. Legs
    i. pain
    ii. distal circulation
    iii. sensation
    iv. motor function
    v. track marks
    vi. medical jewelry
m. Back
    i. pain
    ii. scars

H. Continued Assessment
1. When practical, transport the patient in the recovery position to help ensure a patent airway
2. Consider the need for ALS backup

Medicine
Neurology

EMT Education Standard

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

EMT-Level Instructional Guideline

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

I. Stroke/TIA
   - A. Causes
     1. Hemorrhage
     2. Clot
   - B. Review of Anatomy and Function of the Brain and Cerebral Blood Vessels
   - C. Assessment Findings and Symptoms
     1. Confused, dizzy, weak
     2. Decreasing or increasing level of consciousness
     3. Combative or uncooperative or restless
     4. Facial drooping, inability to swallow, tongue deviation
     5. Double vision or blurred vision
     6. Difficulty speaking or absence speech
     7. Decreased or absent movement of one or more extremities
     8. Headache
     9. Decreased or absent sensation in one or more extremities or other areas of body
     10. Coma
   - D. Stroke Alert Criteria
     1. Cincinnati Prehospital Stroke Scale
     2. Other stroke scales
   - E. Management of Patient With Stroke Assessment Findings or Symptoms
   - F. Scene Safety and Standard Precautions
     1. ABCs /position
     2. Oxygen/suction
     3. Pulse oximetry
     4. Emotional support
     5. Rapid transport
   - G. Transient Ischemic Attack (TIA)

II. Seizures
- A. Incidence
- B. Causes
- C. Types of Seizures
  - 1. Generalized tonic – clonic
    - a. Aura
    - b. Tonic
    - c. Clonic
    - d. Postictal
  - 2. Partial seizures
  - 3. Status epilepticus
- D. Assessment Findings
  - 1. Spasms, muscle contractions
  - 2. Bite tongue, increased secretions
  - 3. Sweating
  - 4. Cyanosis
  - 5. Unconscious gradually increasing level of consciousness
  - 6. May cause shaking or tremors and no loss of consciousness
  - 7. Incontinent
  - 8. Amnesia of event
- E. Management
  - 1. Safety of patient/position
  - 2. ABCs, consider nasopharyngeal airway
  - 3. Oxygen/suction
  - 4. Pulse oximetry
  - 5. Emotional support

III. Headache
- A. As a Symptom
- B. As a Neurological Condition
- C. Assessment Findings and Symptoms
- D. Management

IV. Age-Related Variations for Pediatric and Geriatric Assessment and Management
- A. Pediatrics
  - 1. Epidemiology
  - 2. Anatomic and physiologic differences in children
  - 3. Pathophysiology
  - 4. Causes of altered mental status in children
  - 5. Assessment
    - a. History
    - b. Physical findings
  - 6. Meningitis
  - 7. Seizures
  - 8. Altered mental status
  - 9. Management
- B. Geriatrics – Stroke Common in This Age Group

V. Communication and Documentation

VI. Transport Decisions -- Rapid Transport to Appropriate Facility

Medicine

Abdominal and Gastrointestinal Disorders

EMT Education Standard

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

EMT-Level Instructional Guideline

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

I. Define Acute Abdomen

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

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

c. Color
d. Odor

4. Weight loss
5. Belching/flatulence
6. Concurrent chest pain
7. Pain, tenderness, guarding, distension
8. Other

IV. General Management for Patients With an Acute Abdomen
- A. Scene Safety and Standard Precautions
- B. Airway, Ventilatory, and Circulation
- C. Position
- D. Emotional Support

V. Specific Acute Abdominal Conditions—Definition, Causes, Assessment Findings and Symptoms, Complications, and Specific Prehospital Management
- A. Acute and Chronic Gastrointestinal Hemorrhage
- B. Peritonitis
- C. Ulcerative Diseases

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

VII. Pediatrics
- A. Anatomic and Physiologic Differences in Children
- B. Pathophysiology
- C. Assessment
  1. History
  2. Physical findings
     a. Vomiting causes dehydration
     b. Appendicitis common in children
     c. Abdominal pain from constipation
     d. Vomiting
     e. GI Bleeding
  3. Management
- D. Geriatric
  1. May not exhibit rigidity or guarding
  2. Abdominal pain related to cardiac conditions

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

IX. Transport Decisions

Medicine
Immunology

EMT Education Standard

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

EMT-Level Instructional Guideline

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

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

II. Basic Immune System's Response to Allergens
   A. The Purpose of the Response
   B. The Type of Response (Local versus Systemic)
   C. The Speed of the Response

III. Fundamental Pathophysiology
   A. Increased Capillary Permeability
   B. Vasodilation
   C. Bronchoconstriction
   D. Increased Mucus Production

IV. Assessment Findings for Allergic Reaction
   A. Respiratory System—Sneezing, Tightness in Chest, Cough, Rapid and Labored Breathing, Wheezing, Stridor
   B. Cardiovascular—Increased Heart Rate
   C. Skin—Pale or Redness, Hives, Swelling Locally or Generalized, Itching
   D. Other—Anxiety, Itchy and Watery Eyes, Dizziness

V. Assessment Findings for Anaphylaxis
   A. Respiratory System—Severe Respiratory Distress, Wheezing to Silent Chest
   B. Cardiovascular—Rapid Pulse, Hypotension
   C. Skin—Pale, Red, or Cyanotic
   D. Other—Decreasing Mental Status

VI. Management
- A. ABCs
- B. Position
- C. Oxygen
- D. Emotional Support
- E. Vitals
- F. Assist With Patient's Auto injector
- G. Remove Allergen If Possible

VII. Epinephrine as a Treatment for Allergic Reaction
- A. Indications – Severe Allergic Reaction or Hypersensitivity to Exposed Substance
- B. Contraindications – Not Patient's Drug, Expired, or Discolored
- C. Actions – Slows Allergic Response, Raises B/P, Dilates the Bronchioles
- D. Side Effects – Increased Pulse Rate and B/P, Anxiety, Cardiac Arrhythmias
- E. Auto injection Systems
  1. Physician order
  2. Expiration date and patient prescription
  3. Prep site, remove needle cover
  4. Lateral thigh; push against thigh; hold until drug fully injected
  5. Monitor patient response
  6. Dispose properly

VIII. Consider Age-Related Variations for Pediatric and Geriatric Assessment and Management
- A. Pediatric – Pediatric Weight-Based Auto injector Available
- B. Geriatric – Possible Contraindication in Coronary Artery Disease

IX. Communication and Documentation

X. Transport Decisions

Medicine
Infectious Disease

EMT Education Standard

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

EMT-Level Instructional Guideline

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

I. Causes of Infectious Disease
   A. Infectious Agents
      1. Bacteria
      2. Viruses
      3. Fungi
      4. Protozoa
      5. Helminths (worms)

II. Body Substance Isolation, Personal Protective Equipment, and Cleaning and Disposing of Equipment and Supplies
   A. Principles of Body Substance Isolation
   B. Hand Washing Guidelines
   C. Recommendations for PPE
   D. Recommendations for Cleaning or Sterilization of Equipment
   E. Recommendations for Disposing of Contaminated Linens and Supplies Including Sharps
   F. Recommendations for Decontaminating the Ambulance

III. Consider Age-Related Variations in Pediatric and Geriatric Patients as They Relate Assessment and Management of Patients With a Gastrointestinal Condition or Emergency

IV. Communication and Documentation for a Patient With a Communicable or Infectious Disease

V. Transport Decisions Including Special Infection Control Procedures

VI. Legal Requirements Regarding Reporting Communicable or Infectious Diseases/Conditions
   A. Exposure of Health Care Provider
      1. Current recommended treatment modalities and follow-up
      2. Prevention of exposure or immunizations/vaccines
VII. Required Reporting to the Health Department or Other Health Care Agency

Medicine
Endocrine Disorders

EMT Education Standard

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

EMT-Level Instructional Guideline

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

I. Introduction
   A. Definition of Terms
      1. Diabetes—types I and II
      2. Hypoglycemia
      3. Hyperglycemia, diabetic ketosis
   B. Anatomy and Function of the Pancreas
   C. General Assessment Findings and Symptoms
      1. Confusion, vertigo, headache, syncope
      2. Decreasing level of consciousness
      3. Combative or uncooperative or restless
      4. Increasing level of consciousness
      5. Visual changes
      6. Speech changes
      7. Movement and sensation changes

II. Diabetes
   A. Overview of Condition
      1. Incidence
      2. Explanation of relationship of glucose and insulin
      3. Normal Blood Glucose Levels (BGL)
      4. Types
         a. Type 1 (formerly known as Insulin Dependent Diabetes or Type I)
         b. Type 2 (formerly known as Non-Insulin Dependent Diabetes or Type II)
            i. oral agents
            ii. diet-controlled
      5. Diabetic medications
         a. Insulins
         b. Oral agents
      6. Complications

B. Hyperglycemia/Diabetic Ketoacidosis
   1. Pathophysiology
   2. Causes
   3. History and assessment findings
      a. onset—slow changes in mental status
      b. Kussmaul's breathing, acetone breath
      c. Dehydration, poor skin tugor, pale, warm and dry
      d. Weakness, nausea, and vomiting
      e. Weak and rapid pulse
      f. Polyuria, polydipsia, polyphagia
      g. Other
      h. Medical alert identification
   4. Management
      a. ABCs (airway adjunct)
      b. Position
      c. Oxygen
      d. Pulse oximetry
      e. Emotional support
C. Hypoglycemia
   1. Causes
   2. History and assessment findings
      a. Onset – rapid changes in mental status
      b. Bizarre behavior, tremors, shaking
      c. Sweating, hunger
      d. Rapid full pulse, rapid shallow respirations
      e. Seizures, coma late
      f. Medical alert identification
   3. Management
      a. ABCs, oxygen
      b. Oral glucose as indicated (must be able to control airway)
      c. Emotional support
   4. Oral glucose
      a. Indication/contraindications
      b. Actions
      c. Side effects
      d. Dose and route
      e. Medical control role
      f. When in doubt if hyper/hypoglycemia, give glucose
D. Consider Age-Related Variations for Pediatric and Geriatric Assessment and Management
   1. Pediatric
      a. Usually insulin dependant called juvenile diabetes
      b. Late stages of hyperglycemia may have cerebral edema
      c. Prone to seizures
      d. Prone to dehydration
      e. May be undiagnosed

2. Geriatric
    a. Can mask signs and symptoms of myocardial infarction
    b. Prone to dehydration and infections

III. Communication and Documentation

IV. Transport Decisions—Rapid Transport for Altered Level of Consciousness

Medicine
Psychiatric

EMT Education Standard

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

EMT-Level Instructional Guideline

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

I. Define
   A. Behavior
   B. Psychiatric Disorder
   C. Behavioral Emergency

II. Epidemiology of Psychiatric Disorders

III. Assessment
   A. General Appearance
   B. Speech
   C. Skin
   D. Posture/Gait
   E. Mental Status
   F. Mood, Thought, Perception, Judgment, Memory, and Attention

IV. Behavioral Change
   A. Factors That May Alter a Patient's Behavior – May Include Situational Stresses, Medical Illnesses, Psychiatric Problems, and Alcohol or Drugs
   B. Common Causes of Behavioral Alteration
      1. Low blood sugar
      2. Lack of oxygen
      3. Hypoperfusion
      4. Head trauma
      5. Mind altering substances
      6. Psychogenic – resulting in psychotic thinking, depression or panic
      7. Excessive cold
      8. Excessive heat
      9. Meningitis
      10. Seizure disorders
      11. Toxic ingestions – overdose
      12. Withdrawal of drugs or alcohol

V. Psychiatric Emergencies
- A. Acute Psychosis
- B. Assessment for Suicide Risk
  - 1. Depression
  - 2. Risk factors/signs or symptoms
    - a. Ideation or defined lethal plan of action which has been verbalized and/or written
    - b. Alcohol and substance abuse
    - c. Purposelessness
    - d. Anxiety, agitation, unable to sleep or sleeping all the time
    - e. Feeling trapped, no way out
    - f. Hopelessness
    - g. Withdrawal from friends, family and society
    - h. Anger and/or aggressive tendencies
    - i. Recklessness or engaging in risky activities
    - j. Dramatic mood changes
    - k. History of trauma or abuse
    - l. Some major physical illness (cancer, CHF, etc.)
    - m. Previous suicide attempt
    - n. Job or financial loss
    - o. Relational or social loss
    - p. Easy access to lethal means
    - q. Lack of social support and sense of isolation
    - r. Certain cultural and religious beliefs
  - 3. Important questions
    - a. How does the patient feel?
    - b. Determine suicidal tendencies
    - c. Is patient threat to self or others?
    - d. Is there a medical problem?
    - e. Is there trauma involved?
    - f. Interventions?
- C. Agitated Delirium
  - 1. Emergency medical care
    - a. Scene size-up, personal safety
    - b. Establish rapport
      - i. utilize therapeutic interviewing techniques
        - a) engage in active listening
        - b) supportive and empathetic
        - c) limit interruptions
        - d) respect patient's territory, limit physical touch
      - ii. avoid threatening actions, statements and questions
      - iii. approach slowly and purposefully
    - c. Patient assessment
      - i. intellectual functioning
      - ii. orientation
      - iii. memory
      - iv. concentration

v. judgment
vi. thought content
a) disordered thoughts
b) delusions, hallucinations
c) unusual worries, fears
vii. language
a) speech pattern and content
b) garbled or unintelligible
viii. mood
a) anxiety, depression, elation, agitation
b) level of alertness, distractibility
i) appearance, hygiene, dress
ii) psychomotor activity

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

VI. Medical-Legal Considerations
A. Types of Restraints
B. Transport Against Patient Will

VII. Consider Age-Related Variations for Pediatric and Geriatric Assessment and Management
A. Pediatric Behavioral Emergencies
1. Teenage suicide concerns
2. Aggressive behavior may be a symptom of an underlying disorder or disability
B. Geriatrics -- suicide issues/depression common

Medicine
Cardiovascular

EMT Education Standard

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

EMT-Level Instructional Guideline

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

I. Anatomy of the Cardiovascular System
   A. Heart
      1. Chambers
      2. Valves
      3. Blood supply to myocardium
      4. Myocardial muscle cells
      5. Specialized electrical cells
      6. Automaticity
      7. Autonomic system control
         a. Sympathetic – "fight or flight"
         b. Parasympathetic
   B. Vessels
      1. Aorta
      2. Arteries
      3. Arterioles
      4. Capillaries
      5. Venules
      6. Veins
      7. Vena cava
   C. Blood
      1. Red blood cells
      2. White blood cells
      3. Platelets
      4. Plasma

II. Physiology
   A. Cardiac Cycle
      1. Systole
      2. Diastole

B. Pulses
   1. Peripheral Pulses
   2. Central pulses
C. Blood Pressure
   1. Systolic
   2. Diastolic
D. Blood Circulation Through a Double Pump
   1. Respiratory system
      a. Deoxygenated blood to lungs
      b. Oxygenated blood back to heart
   2. Body
E. Cardiac Output
   1. Heart rate X blood volume ejected/beat
F. Perfusion
   1. Function of red blood cells in oxygen delivery
   2. Factors governing adequate perfusion
      a. Rate
      b. Pump
      c. Volume
G. Oxygenation of Tissues
   1. Delivery of oxygenated blood
   2. Removal of tissue wastes

III. Pathophysiology
A. Cardiac Compromise
   1. Inadequate circulation of blood and/ or perfusion of vital processes or organs
   2. Atherosclerosis
      a. Plaque buildup in lumen of artery
      b. Obstruction of blood flow
      c. Interference with dilation and constriction of vessel
      d. Occlusion
      e. Ischemia is a result of decreased blood flow
   3. Rate-related compromise
   4. Inadequate pumping
   5. Inappropriate circulating volume

IV. Assessment
A. Primary Survey
   1. Level of responsiveness
      a. Restlessness, anxiety
      b. Feeling of impending doom
   2. Airway
   3. Breathing
      a. Rate and depth
      b. Effort

c. Breath sounds
d. Significance of findings

4. Circulation
   a. Pulse
      i. rate
      ii. quality
   b. Skin
      i. color
      ii. temperature
      iii. moisture
      iv. edema
   c. Blood pressure

B. History
1. Chief complaint
2. History of the present illness
   a. Chest discomfort/pain
      i. signs and symptoms
      ii. OPQRST evaluation
   b. Respiratory
      i. dyspnea
         a) continuous
         b) exertional
         c) non-exertional
         d) orthopneic
      ii. cough
         a) dry
         b) productive
   c. Related signs and symptoms
      i. nausea/vomiting
      ii. fatigue
      iii. palpitations
      iv. headache
      v. recent trauma
3. Past medical history
   a. SAMPLE history
   b. Previous heart disease/surgery
      i. angina
      ii. previous AMI
      iii. hypertension
      iv. heart failure
      v. valve disease
      vi. aneurysm
      vii. pulmonary disease
      viii. diabetes
      ix. COPD
      x. renal disease

c. Current/past medications
i. prescribed
ii. over-the-counter
iii. home remedies
iv. recreational drug use
d. Family history

C. Secondary Survey

V. Management (refer to the current American Heart Association guidelines)
A. Place in proper position
B. Evaluation and appropriate management of ventilations/respirations
1. Oxygen saturation evaluation
2. pulse oximetry
C. May be unreliable in cardiac arrest, toxic inhalation
1. Appropriate management of any related ventilatory/respiratory compromise
a. BVM assistance
b. PEEP
c. CPAP/BiPAP
d. MTV/ATV
2. Appropriate oxygen therapy
D. Evaluation and appropriate management of cardiac compromise
1. Manual and auto BP
2. Mechanical CPR
3. AED
E. Pharmacological interventions
1. Aspirin
2. Nitroglycerin
3. Oral glucose
F. Consider AEMT/Paramedic assistance at the scene
G. Appropriate transportation

VI. Specific Cardiovascular Emergencies (refer to current American Heart Association guidelines)
A. Acute Coronary Syndromes (ACS) Heart Failure
B. Hypertensive Emergencies
1. Systolic BP greater than 160 mmHg
2. Diastolic BP greater than 94 mmHg
3. Signs and symptoms
a. Strong, bounding pulse
b. Skin warm, dry, or moist
c. Headache
d. Ringing in ears
e. Nausea/vomiting
f. Nose bleed
4. Assessment
C. Cardiogenic Shock

D. Cardiac Arrest

VII. Pharmacological Agents

A. Aspirin
   1. Generic and trade names
   2. Indications
   3. Contraindications
   4. Actions
   5. Side effects
   6. Precautions
   7. Expiration date
   8. Dosage
   9. Administration

B. Nitroglycerin
   1. Generic and trade names
   2. Indications
   3. Contraindications
   4. Actions
   5. Side effects
   6. Precautions
   7. Expiration date
   8. Dosage
   9. Administration

C. Role of Medical Oversight in Medication Administration

D. Patient Assisted Administration

E. Documentation

VIII. Consider Age-Related Variations for Pediatric and Geriatric Patients for Assessment and Management of Cardiac Compromise

A. Pediatric
   1. Cardiac problems typically associated with congenital heart condition
   2. Cardiovascular compromise often caused by respiratory compromise

B. Geriatric -- typical MI presentation often related to other underlying disease processes
   1. Diabetes
   2. Asthma
   3. COPD

Medicine
Toxicology

EMT Education Standard

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

EMT-Level Instructional Guideline

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

I. Introduction
   A. Define Toxicology, Poisoning, Overdose
   B. National Poison Control Center
   C. Routes of Absorption
      1. Ingestion
      2. Inhalation
      3. Injection
      4. Absorption

II. Poisoning by Ingestion
   A. Examples
   B. Assessment Findings
   C. General Management Considerations

III. Poisoning by Inhalation
   A. Examples
   B. Assessment Findings
   C. General Management Considerations

IV. Poisoning by Injection
   A. Examples
   B. Assessment Findings
   C. General Management Considerations

V. Poisoning by Absorption
   A. Examples
   B. Assessment Findings
   C. General Management Considerations

VI. Drugs of Abuse
- A. Opiates/Narcotics
  - 1. Common causative agents
  - 2. Assessment findings and symptoms
    - a. Decreased level of consciousness, sedation
    - b. Hypotension
    - c. Respiratory depression/arrest
    - d. Nausea, pinpoint pupils
    - e. Seizures and coma
  - 3. Management for a patient using opiates
- B. Alcohol
  - 1. Overview of alcoholism including long-term effects
  - 2. Alcohol abuse
    - a. CNS changes—agitation to sedation to altered level of consciousness
    - b. Respiratory depression
    - c. Nausea and vomiting
    - d. Uncoordination
  - 3. Alcohol withdrawal
    - a. Tremors, sweating weakness
    - b. Hallucinations and seizures
  - 4. Assessment findings and symptoms for patients with alcohol abuse and alcohol withdrawal
  - 5. Management for a patient using alcohol or withdrawing from alcohol — airway, ventilation, and circulation
- C. Common Causative Agents, Assessment Findings and Symptoms, Management
  - 1. Cannabis
  - 2. Hallucinogens
  - 3. Stimulants
  - 4. Barbiturates/sedatives/ hypnotics

VII. Poisonings and Exposures
- A. Scene Safety Issues
- B. Common Causative Agents, Assessment Findings and Symptoms, Management
  - 1. Pesticides
  - 2. Chemicals
  - 3. Household cleaning poisonings
  - 4. Poisonous plants

VIII. Medication Overdose
- A. Common Causes of Overdoses (Other Than Drugs of Abuse)
  - 1. Cardiac medications
  - 2. Psychiatric medications
  - 3. Non-prescription pain medications including Salicylates and Acetaminophen
  - 4. Other
- B. Assessment Findings and Symptoms for Patients With Medication Overdose
- C. Management for a Patient With Medication Overdose

IX. General Treatment Modalities for Poisonings
- A. Scene Safety
- B. Standard Precautions and Decontamination
- C. Airway Control
- D. Ventilation and Oxygenation
- E. Circulation
- F. Use of Activated Charcoal
  1. Indications/contraindications/side effects
  2. Physician order
  3. Dose

X. Consider Age-Related Variations for Pediatric and Geriatric Assessment and Management
- A. Pediatric
  1. Toddler-aged prone to ingestions of toxic substance
  2. Adolescent prone to experimentation with drugs of abuse
- B. Geriatric -- Alcoholism is common in elderly

XI. Communication and Documentation for Patients With Toxicological Emergencies

XII. Transport Decisions

Medicine
Respiratory

EMT Education Standard

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

EMT-Level Instructional Guideline

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

I. Anatomy of the Respiratory System
   - A. Upper Airway
   - B. Lower Airway
   - C. Lungs and Accessory Structures

II. Normal Respiratory Effort

III. Assessment Findings and Symptoms and Management for Respiratory Conditions
   - A. Respiratory Distress
     - 1. Assessment
       - a. Shortness of breath
       - b. Restlessness
       - c. Increased pulse rate
       - d. Changes in respiratory rate or rhythm
       - e. Skin color changes
       - f. Abnormal sounds of breathing/lung sounds
       - g. Inability to speak
       - h. Retractions
       - i. Altered mental status
       - j. Abdominal breathing
       - k. Coughing
       - l. Tripod position
     - 2. Management of respiratory distress
       - a. Scene safety and Standard Precautions
       - b. ABCs, position
       - c. Oxygen/suction
       - d. Pulse oximetry
       - e. Emotional support
       - f. Transport

IV. Specific Respiratory Conditions—Definition, Causes, Assessment Findings and Symptoms, Complications, and Specific Prehospital Management and Transport Decisions
- A. Asthma
- B. Pulmonary Edema
- C. Chronic Obstructive Pulmonary Disease
- D. Pneumonia
- E. Spontaneous Pneumothorax
- F. Pulmonary Embolism
- G. Epiglottis
- H. Pertussis
- I. Cystic Fibrosis
- J. Environmental/Industrial Exposure/ Toxic Gasses
- K. Viral Respiratory Infections

V. Metered-Dose Inhaler and Small Volume Nebulizer
- A. EMT Role in Assisting
- B. Indication/ Contraindications
- C. Actions
- D. Side Effects
- E. Dose and Route
- F. Medical Control Role

VI. Communication and Documentation for Patients With Respiratory Emergencies

VII. Consider Age-Related Variations for Pediatric and Geriatric Assessment and Management
- A. Pediatric
  - 1. Upper airway obstruction (i.e. foreign body aspiration or tracheostomy dysfunction)
  - 2. Lower airway disease (i.e. foreign body lower airway obstruction)
- B. Geriatrics—Pneumonia and Chronic Conditions Such as COPD Common
  - 1. Upper airway obstruction
    - a. Croup
    - b. Foreign body aspiration
    - c. Epiglottitis
    - d. Tracheostomy dysfunction
  - 2. Lower airway disease
    - a. Asthma
    - b. Bronchiolitis
    - c. Pneumonia
    - d. Foreign body lower airway obstruction
    - e. Pertussis
    - f. Cystic fibrosis

VIII. Transport Decisions

Medicine
Hematology

EMT Education Standard

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

EMT-Level Instructional Guideline

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

I. Anatomy and Physiology
   - A. Blood
     1. Red blood cells
     2. White blood cells
     3. Platelets
   - B. Plasma
   - C. Blood-Forming Organs
     1. Red cell production
     2. Red cell destruction

II. Pathophysiology of Sickle Cell

III. Sickle Cell Crisis
   - A. General Assessment
     1. Level of consciousness
     2. Skin
     3. Visual disturbances
     4. Gastrointestinal
     5. Skeletal
     6. Cardiorespiratory
     7. Genitourinary
   - B. General Management
     1. Airway, ventilation, and circulation
     2. Oxygen
     3. Transport considerations
     4. Psychological/communication strategies

IV. Clotting Disorders

V. Consider Age-Related Variations
   - A. Pediatrics
   - B. Geriatrics

Medicine

Genitourinary/Renal

EMT Education Standard

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

EMT-Level Instructional Guideline

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

I. Anatomy and Physiology of Renal System

II. Pathophysiology
- A. Kidney Failure
- B. Kidney Stones

III. Dialysis
- A. Hemodialysis
  - 1. Shunt
  - 2. Fistula
  - 3. Graft
- B. Peritoneal Dialysis
- C. Special Considerations for Hemodialysis Patients
  - 1. Obtaining B/P
- D. Complications/Adverse Effects of Dialysis
  - 1. Hypotension
  - 2. Muscle cramps
  - 3. Nausea/vomiting
  - 4. Hemorrhage especially from access site
  - 5. Infection at access site
- E. Missed Dialysis Treatment
  - 1. Weakness
  - 2. Pulmonary edema

IV. Management for a Patient With a Dialysis Emergency
- A. ABCs, Support Ventilation
- B. Stop Bleeding From Shunt as Needed
- C. Position—Flat If Shocky, Upright If Pulmonary Edema

V. Urinary Catheter Management

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

VII. Communication and Documentation

VIII. Transport Decisions

Medicine
Gynecology

EMT Education Standard

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

EMT-Level Instructional Guideline

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

I. Introduction
   A. Female Reproductive System Anatomy and Physiology
      1. External Genitalia
      2. Internal Organs and Structures

II. Assessment Findings
   A. Abdominal Pain or Vaginal Pain
   B. Vaginal Bleeding
   C. Vaginal Discharge
   D. Fever
   E. Nausea and Vomiting
   F. Syncope

III. General Management
   A. Protect Privacy and Modesty
   B. Communication Techniques
   C. Consider Pregnancy and/or Sexually Transmitted Diseases

IV. Specific Gynecological Emergencies—Definition, Causes, Risk Factors, Assessment Findings, Management
   A. Vaginal Bleeding
   B. Sexual Assault — Legal Issues
   C. Infections — Pelvic Inflammatory Disease
   D. Sexually Transmitted Diseases

V. Age-Related Variations for Pediatric and Geriatric Assessment and Management
   A. Pediatrics -- Menarche could be cause of bleeding
   B. Geriatrics -- Menopausal women can get pregnant

VI. Communication and Documentation

VII. Transport Decisions

Medicine

Non-Traumatic Musculoskeletal Disorders

EMT Education Standard

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

EMT-Level Instructional Guideline

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

I. Anatomy and physiology review
   - A. Bones
   - B. Muscles

II. Pathophysiology
   - A. Non-Traumatic Fractures (i.e. cancer or osteoporosis)

III. Assessment
   - A. Pain or Tenderness
   - B. Swelling
   - C. Abnormal or Loss of Movement
   - D. Sensation Changes
   - E. Circulatory Changes
   - F. Deformity

IV. Management
   - A. Airway, Ventilation, and Circulation
   - B. Splinting
   - C. Transport Considerations
   - D. Communications and Documentation

V. Consider Age-Related Variations
   - A. Pediatric
   - B. Geriatric

Medicine

Diseases of the Eyes, Ears, Nose, and Throat

EMT Education Standard

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

EMT-Level Instructional Guideline

I. Nosebleed
   A. Causes
      1. Trauma
      2. Medical
         a. Dryness
         b. High blood pressure
   B. General Assessment Findings and Symptoms
      1. Pain or tenderness
      2. Bleeding from nose
      3. Vomits swallowed blood
      4. Can block airway if patient is unresponsive
   C. Techniques to Stop Bleeding in Conscious Patient If No Risk of Spine Injury
      1. Sit patient up and lean forward
      2. Pinch the nostrils together firmly
      3. Tell patient not to sniffle or blow nose

Shock and Resuscitation

EMT Education Standard

Applies a fundamental knowledge of the causes, pathophysiology, and management of shock, respiratory failure or arrest, cardiac failure or arrest, and post-resuscitation management.

EMT-Level Instructional Guideline

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

I. Ethical Issues in Resuscitation
   - A. Withholding Resuscitation Attempts
     - 1. Irreversible death
     - 2. Do Not Resuscitate (DNR) orders
   - B. Provide Emotional Support for Family

II. Anatomy and Physiology Review
   - A. Respiratory System
     - 1. Passageway for fresh oxygen to enter the lungs and blood supply
     - 2. Respiratory waste products to leave the blood and lungs
   - B. Cardiovascular System
     - 1. Heart
       - a. Four chambers
       - b. Pumps blood to the lungs to pick up oxygen
       - c. Pumps blood around the body
         - i. to deliver oxygen and nutrients to the tissues
         - ii. to remove waste products from the tissues
     - 2. Vascular System
       - a. Arteries carry blood to tissues
         - i. carotid pulse
         - ii. femoral pulse
         - iii. radial pulse
         - iv. brachial pulse
       - b. Veins carry blood to heart

III. Respiratory Failure
   - A. Pathophysiology
     - 1. Constrictive
     - 2. Obstructive
     - 3. Destructive

B. Assessment
    1. Pulmonary symptoms
    2. Cardiovascular symptoms
    3. Neurological symptoms
    4. Other symptoms
C. Treatment
    1. Oxygen therapy
    2. Ventilatory support
        a. Carbon dioxide clearance
        b. Pharmacological therapy

IV. Respiratory Arrest
A. Assessment
B. Treatment
    1. Oxygen therapy
    2. Ventilatory support
        a. Carbon dioxide clearance
        b. Advanced airways

V. Cardiac Arrest
A. Pathophysiology
    1. If the heart stops contracting, no blood will flow
    2. The body cannot survive when the heart stops
        a. Organ damage begins quickly after the heart stops
        b. Brain damage begins 4-6 minutes after the patient suffers cardiac arrest — damage becomes irreversible in 8-10 minutes
    3. Cardio-pulmonary resuscitation (CPR)
        a. Artificial ventilation — oxygenates the blood
        b. External chest compressions — pushing on the chest squeezes the heart and simulates a contraction
        c. Oxygenated blood is circulated to the brain and other vital organs
B. General Reasons for the Heart to Stop Beating
    1. Sudden death and heart disease
    2. Breathing stops, especially in infants and children
    3. Medical emergencies
    4. Trauma

VI. Resuscitation
A. System Components to Maximize Survival
    1. Early access
        a. Public education and awareness
            i. rapid recognition of a cardiac emergency
            ii. rapid notification before CPR starts — "phone first"
        b. 911-pre-arrival instructions and dispatcher directed CPR

2. Early CPR
    a. Lay public
        i. family
        ii. bystanders
    b. Emergency Medical Responders
3. Early Defibrillation
4. Early Advanced Care

B. Basic Cardiac Life Support (Refer to the Current American Heart Association Guidelines)
1. Adult CPR and foreign body airway obstruction
2. Child CPR and foreign body airway obstruction
3. Infant CPR and foreign body airway obstruction

C. Airway Control and Ventilation
1. Basic Airway adjuncts
2. Ventilation
    a. Delivery of excessive rate or depth of ventilation reduces blood return to the right side of the hear
    b. Reduces the overall blood flow that can be generated with CPR

D. Chest Compressions
1. Factors which decrease effectiveness
    a. Compression that are too shallow
    b. Slow compression rate
    c. Sub-maximum recoil
    d. Frequent interruptions
2. Devices to assist circulation
    a. Impedance Threshold Device
    b. Mechanical Piston Device
    c. Load-Distributing Band or Vest CPR

VII. Automated External Defibrillation (AED) (Refer to the current American Heart Association guidelines)
A. Adult AED Use
B. Child AED Use
C. Infant AED Use
D. Special AED situations
1. Pacemaker
2. Wet patients
3. Transdermal medication patches

VIII. Shock (Poor Perfusion)
A. Definition
1. Perfusion is the passage of blood and oxygen and other essential nutrients to the body's cells
2. While delivering these essentials to the body's cells, the circulatory system is also removing waste such as carbon dioxide from the cells

3. Shock is a state of hypoperfusion, or inadequate perfusion of blood through body tissues
4. Hypoperfusion can lead to death if not corrected

B. Anatomy and Physiology Review
1. Heart/Blood vessels
2. Physiology of respiration
   a. Gas exchange
      i. alveolar level
      ii. tissue level
   b. Circulation
      i. pulmonary
      ii. systemic
3. Essential components for normal perfusion
   a. Functioning pump/heart
      i. pump delivers blood to the tissue
      ii. pump collects blood from the body
      iii. controlled by the autonomic nervous system during shock
   b. Adequate volume
      i. blood contains formed elements
         a) RBCs transport oxygen
         b) WBCs fight infection
         c) platelets form blood clots
         d) clots are very unstable and prone to rupture
      ii. plasma is the fluid that transports the formed elements
   c. Intact container/vessels
      i. arteries surrounded by smooth muscle contract and dilate to deliver blood to tissue
      ii. capillary beds are the site where perfusion occurs
      iii. veins are low pressure vessels responsible for returning blood to the heart
      iv. smooth muscle and sphincters controlled by the autonomic nervous system to constrict or dilate
      v. blood flow controlled by cellular tissue demands

C. Disruptions That Can Cause Shock
1. Inadequate fluid/blood – blood/water loss
2. Failing pump/heart
   a. Disease or injury to conduction system
   b. Damage to cardiac muscle
3. Leaky or dilated container/vessels
   a. Loss of nervous control
   b. Severe allergic reactions
   c. Massive infection
   d. Hypothermia

D. Categories of Shock
    1. Compensated shock
    2. Decompensated shock
    3. Irreversible shock
E. Shock Due to Fluid Loss
    1. Hypovolemic
        a. Examples
        b. Signs and symptoms
F. Shock Due to Pump Failure
    1. Cardiogenic
        a. Examples
        b. Signs and symptoms
G. Shock Due to Container Failure
    1. Anaphylaxis
        a. Examples
        b. Signs and symptoms
    2. Neurogenic
        a. Examples
        b. Signs and symptoms
    3. Sepsis
        a. Examples
        b. Signs and symptoms
H. Patient Assessment
    1. Complete a scene size-up
    2. Perform a primary assessment
    3. Obtains a relevant history
    4. Perform secondary assessment
    5. Perform a reassessment
I. Management
    1. Manual in-line spinal stabilization, as needed
    2. Comfort, calm, and reassure the patient while awaiting additional EMS resources
    3. Do not give food or drink
    4. Airway control – adjuncts, as needed
    5. Breathing
        a. Oxygen administration (high-flow/high-concentration)
        b. Assist ventilation, as needed
    6. Circulation
        a. Attempt to control obvious uncontrolled external bleeding
        b. Position patient appropriately for all ages
        c. Keep patient warm – attempt to maintain normal body temperature
    7. Pneumatic anti-shock garment (PASG) application
    8. Begin transport at the earliest possible moment
    9. Treat any additional injuries that may be present

J. Age-related variations
  1. Pediatrics
    a. Common causes of shock
      i. trauma
      ii. fluid loss
      iii. infection
      iv. anaphylaxis
      v. congenital heart disease
      vi. chest wall injury
    b. Presentation of Shock
      i. cardiovascular
      ii. skin signs
      iii. CNS
      iv. decreased fluid output
      v. vital signs
    c. Management
      i. inline spinal stabilization, if indicated
      ii. suction, as needed
      iii. high oxygen concentration
      iv. control bleeding
      v. positioning
      vi. maintain body temperature
      vii. transport
  2. Geriatrics
    a. Assessment
      i. body system changes affecting presentation of shock
        a) CNS
        b) cardiovascular
        c) respiratory
        d) skin
        e) renal
        f) GI
      ii. vital signs changes
        a) CNS
        b) hypoxia
      iii. airway
        a) decreased cough reflex
        b) cervical arthritis
        c) loose dentures
      iv. breathing
        a) higher resting respiratory rate
        b) lower tidal volume
        c) less elasticity/compliance of chest wall

v. circulation
    a) higher resting heart rate
    b) irregular pulses
vi. skin
    a) dry, less elastic
    b) cold
    c) fever, not common
    d) hot

b. Management
    i. inline spinal stabilization, if indicated
    ii. suction, as needed
    iii. high oxygen concentration
    iv. control bleeding
    v. positioning
    vi. maintain body temperature
    vii. transport

Trauma
Trauma Overview

EMT Education Standard

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

EMT-Level Instructional Guideline

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

I. Identification and Categorization of Trauma Patients
   A. Entry-level students need to be familiar with the National Trauma Triage Protocol
      1. Centers for Disease Control and Prevention. Guidelines for Field Triage of Injured Patients: Recommendations of the National Expert Panel on Field Triage. MMWR 2008:58 RR-1:1-35.
      2. http://cdc.gov/fieldtriage contains the National Trauma Triage Protocols and additional instructional materials.

II. Pathophysiology of the Trauma Patient
   A. Blunt Trauma
      1. Non-bleeding
      2. Multiple forces and conditions can cause blunt trauma
   B. Penetrating Trauma -- high, medium, and low velocity

II. Assessment of the Trauma Patient
   A. Major Components of the Patient Assessment
      1. Standard precautions
      2. Scene size-up
      3. General impression
      4. Mechanism of injury
      5. Primary assessment
      6. Baseline vital signs
      7. History
      8. Secondary assessment
      9. Re-assessment
   B. Mechanism of Injury (MOI)
      1. Significant MOI (including, but not limited to)
         a. Multiple body systems injured
         b. Vehicle Crashes with intrusion
         c. Falls from heights
         d. Pedestrian versus vehicle collision

e. Motorcycle crashes
f. Death of a vehicle occupant in the same vehicle

2. Non-significant MOI (including, but not limited to)
   a. Isolated trauma to a body part
   b. Falls without loss of consciousness (adult and pediatric)
3. Pediatric considerations
   a. Falls >10 feet without loss of consciousness
   b. Falls <10 feet with loss of consciousness
   c. Bicycle collision
   d. Medium- to high-speed vehicle collision (>25 mph)
4. Re-evaluating the MOI
5. Special Considerations
   a. Spinal precautions must be initiated soon as practical based on the MOI
   b. When practical, roll the supine patient on their side to allow for an appropriate assessment of the posterior body
   c. Consider the need for ALS backup for all patients who have sustained a significant MOI

C. Primary Survey
1. Airway
   a. Clear airway; jaw thrust, suction
   b. Protect airway
2. Breathing
   a. Assess ventilation
   b. Administer high concentration oxygen
   c. Check thorax and neck
      i. deviated trachea
      ii. tension pneumothorax
      iii. chest wounds and chest wall motion
      iv. sucking chest wound
      v. neck and chest crepitation
      vi. multiple broken ribs
      vii. fractured sternum
   d. Listen for breath sounds
   e. Circulation
      i. Apply pressure to sites of external bleeding
      ii. Radial and carotid pulse locations, B/P determination
      iii. Jugular venous distention
   f. Hypovolemia
   g. Disability
      i. brief neurological exam
      ii. pupil size and reactivity
      iii. limb movement
      iv. Glasgow Coma Scale

h. Exposure
i. completely remove all clothes
ii. logroll as part of inspection

D. Secondary Assessment - Head-to-Toe Physical Exam
1. Described in detail in Patient Assessment: Secondary Survey

E. Secondary Assessment
1. Rapid Method
2. Modified secondary assessment

F. Trauma Scoring
1. Glasgow Coma Score
2. Revised Trauma Score

III. Management of the Trauma Patient

A. Rapid Transport and Destination Issues
1. Scene time
2. Air versus ground

B. Destination Selection

C. Trauma System Components
1. Hospital categorizations
2. Levels and qualifications

D. Transport Considerations

Trauma

Bleeding

EMT Education Standard

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

EMT-Level Instructional Guideline

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

I. Pathophysiology
   A. Type of Traumatic Bleeding
      1. Internal
      2. External
      3. Arterial
         a. Bright red bleeding "spurting"
         b. Difficult to control, due to size of vessels, volume of blood, and pressure that blood is pushed through arteries
         c. As blood pressure drops, amount of spurting blood drops
      4. Venous
         a. Darker red blood can vary from slow to severe stream, depending on size of vein
         b. Can be difficult to control, but easier to control than arterial bleeds
         c. Bleeding can be profuse and life-threatening
      5. Capillary – blood oozes from wound
         a. Usually easy to control or stop without intervention
         b. Clots spontaneously
   B. Severity – Related to
      1. Volume of blood loss
      2. Rate of blood loss
      3. Age and pre-existing health of patient
   C. Physiological Response to Bleeding
      1. Clotting and clotting disorders
      2. Factors that affect clotting
         a. Movement of injured area
         b. Body temperature
         c. Medications
         d. Removal of bandages
      3. Localized vasoconstriction

II. General Assessment
- A. Mechanism of Injury
- B. Primary Survey
  1. Identify and manage life threats related to bleeding
  2. Mental status
- C. Physical Exam
  1. Blood pressure is not a reliable indicator of early shock
  2. Lung sounds
  3. Peripheral perfusion
  4. Skin parameters
- D. History – Pre-Existing Illnesses
- E. Pediatric Considerations
  1. Vital sign variations
  2. Total fluid volume less than adults
- F. Geriatric Considerations

III. Management Strategies
- A. Body Substance Isolation
- B. Airway Patency – May be obstructed if unconscious
- C. Oxygenation and Ventilation
  1. Pulse oximetry
  2. Apply oxygen
- D. Internal and External Bleeding Control
  1. External bleeding
     - a. Direct pressure
       - i. application of even pressure to an open injury that includes the area just proximal and distal to the injury
       - ii. using a gloved hand and dressings, the wound is covered and firm pressure applied until bleeding is controlled
       - iii. usually effective in capillary and minor venous bleeding
       - iv. in cases of heavier bleeding or major wounds, multiple dressings may be necessary; do not remove existing dressings but apply additional dressings on top of existing dressings in cases of continuing hemorrhage
     - b. Splints
       - i. soft
       - ii. rigid
       - iii. traction splint
       - iv. pressure splints
     - c. Tourniquet – if severe bleeding is not controlled by direct pressure
     - d. Signs and symptoms – bleeding may not slow after much blood loss
       - i. some patients may be quiet and calm due to excessive blood loss
       - ii. the amount of blood at the scene does not always indicate the amount of blood loss; the patient may move

iii. estimating the amount of blood loss by the size of a blood pool or the amount on clothing is not accurate
iv. assess for signs and symptoms of shock

2. Internal bleeding
   a. Definition/description
      i. any bleeding in a cavity or space inside the body.
      ii. internal bleeding can be severe and life threatening.
      iii. may initially go undetected without proper assessment (mechanism of injury, signs, and symptoms)
   b. Signs and symptoms
      i. guarding, tenderness, deformity, discoloration of the affected area
      ii. coughing up blood, blood in urine, rectal bleeding
      iii. abdominal tenderness, guarding, rigidity, distention
      iv. bleeding from a body orifice.
      v. signs of shock

E. Stabilize Body Temperature
F. Psychological Support
G. Transport Considerations
   1. Trauma center
   2. Aeromedical transport
   3. ALS mutual aid

Trauma

Chest Trauma

EMT Education Standard

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

EMT-Level Instructional Guideline

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

I. Incidence of Chest Trauma
   - A. Morbidity
   - B. Mortality

II. Mechanism of Injury for Chest Trauma
   - A. Blunt
   - B. Penetrating
   - C. Energy and Injury

III. Anatomy of the Chest
   - A. Skin
   - B. Muscles
   - C. Bones
   - D. Trachea
   - E. Bronchi
   - F. Lungs
   - G. Vessels
   - H. Heart
   - I. Esophagus
   - J. Mediastinum

IV. Physiology
   - A. Role of the Chest in Systemic Oxygenation
     1. Musculoskeletal structure
     2. Intercostal muscle
     3. Diaphragm
     4. Accessory muscle
     5. Changes in intrathoracic pressure

B. Ventilation
    1. Gas exchange depends on
        a. Normal inspiration
            i. active process
            ii. normal chest rise
            iii. negative pressure in chest allows air to flow in
        b. Normal expiration – passive process
    2. Chest wall movement – intact chest wall
    3. Minute volume – volume of air exchanged between lungs and environment per minute

V. Pathophysiology of Chest Trauma
    A. Impaired Cardiac Output Related to
        1. Trauma that affects the heart
            a. Heart can't refill with blood
            b. Blood return to the heart is blocked
        2. Blood loss (external and internal)
    B. Impaired Ventilation
        1. Collapse of lung
        2. Multiple rib fractures
    C. Impaired Gas Exchange
        1. Blood in lungs
        2. Bruising of lung tissue

VI. General Assessment Findings
    A. Vital Signs
        1. Blood pressure
        2. Pulse
            a. Increases initially if hypoxia or shock
            b. Decreases when patient near arrest from shock or hypoxia
        3. Respiratory rate and effort – respiratory distress
    B. Skin – Color, Temperature, Moisture
    C. Head, Neck, Chest, and Abdomen
        1. Jugular vein distension
        2. Paradoxical movement
    D. Level of Consciousness
    E. Medical History
        1. Medications
        2. Respiratory/cardiovascular diseases
    F. Physical Exam
        1. Inspection
        2. Auscultation – breath sounds present or absent
        3. Palpation
    G. Associated Injuries
    H. Blunt Injury
    I. Penetrating Injury

VII. General Management
- A. Airway and Ventilation
  - 1. Occlusion of open wounds
  - 2. Positive pressure ventilation – to support flail chest
- B. Circulation

VIII. Blunt Trauma or Closed Chest Injury
- A. Closed Chest Injury
  - 1. Specific injuries
    - a. Rib fractures
    - b. Flail segment – stabilizing a flail is contraindicated
    - c. Sternal fracture – consider underlying injury
    - d. Clavicle fracture
    - e. Commotio Cordis

IX. Open Chest Injury
- A. Mechanism of Injury
  - 1. Penetrating injury from weapons
  - 2. Penetrating injury secondary to blunt chest wall trauma
  - 3. Specific injuries
    - a. Lung Injury
    - b. Air in pleural space causes lung to collapse (pneumothorax)
      - i. closed
      - ii. open (sucking chest wound)
    - c. Increasing amounts of air in space causing pressure on vessels and heart (tension pneumothorax)
    - d. Blood in chest due to injury (hemothorax)
    - e. Signs and symptoms of lung injury
      - i. oxygenation changes due to open chest injuries
      - ii. decreased or absent lung sounds due to open chest injuries
    - f. Assessment of lung injury – presence or absence of lung sounds
    - g. Management – apply non-porous (occlusive) dressing
    - h. Myocardial injury
    - i. Penetrating – effect on pumping action of the heart and blood loss with blood in the sac surrounding the heart restricting heart's ability to pump (pericardial tamponade)
    - j. Signs and symptoms of heart injury
      - i. irregular pulse
      - ii. chest pain
      - iii. hypo-perfusion
    - k. Assessment
    - l. Management

X. Age-Related Variations for Pediatric and Geriatric Assessment and Management
- A. Pediatric
- B. Geriatric

Trauma

Abdominal and Genitourinary Trauma

EMT Education Standard

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

EMT-Level Instructional Guideline

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

I. Incidence
   A. Morbidity
   B. Mortality

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

III. Physiology
   A. Solid Organs
   B. Hollow Organs
   C. Vascular Structures

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

d. Discoloration of abdominal wall
e. Tenderness – on movement
f. Lower rib fractures
g. May be overlooked in multi-system injuries
h. Suspicion based on mechanism of injury

3. Assessment
a. Inspection
b. Noting position of the patient
c. Noting pain with movement
d. Auscultation – little value
e. Blood loss through rectum or vomit

4. Management
a. Oxygen
b. Transport in position of comfort if indicated
c. Treat for shock – internal bleeding

B. Penetrating/Open Abdominal Trauma
1. Low-velocity penetration – knife wound, tear of abdominal wall, consider injury to underlying organ
2. Medium velocity penetration – shot gun wound
3. High velocity penetration – gunshot wound
4. Signs and Symptoms of penetrating abdominal trauma
a. Bleeding
b. Puncture wounds – entrance and exits
c. Many signs and symptoms of closed abdominal wounds could also be present along with a puncture wound

5. Assessment
a. Clothing removal
b. Inspection – look for exit wounds including posterior
c. Noting position of patient

6. Management
a. Cover wounds
b. Use non-porous dressing if chest may be involved
c. Treat for shock
d. Oxygen
e. Transport decision

C. Considerations in Abdominal Trauma
1. Hollow organs injuries
a. Stomach
b. Small bowel
c. Large bowel
d. Gallbladders
e. Urinary bladder
f. Considerations of signs and symptoms of hollow organ injuries
i. pain – may be intense with open wounds to the stomach or small bowel
ii. infection – delayed complication which may be fatal
iii. air in peritoneal cavity

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

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

VI. General Management
    A. Scene Safety / Standard Precautions
    B. Airway Management
    C. Oxygenation and Ventilation
    D. Spinal Immobilization Considerations
    E. Control External Hemorrhage
    F. Identification of Life-Threatening Injury

G. Application and Inflation of PASG for Pelvic Fracture Stabilization
H. Abdominal Trauma May Be Masked by Other Body System Trauma
I. Transportation to Appropriate Facility
    1. No transport decisions
    2. Transport to acute care facility
    3. Transport to trauma center
    4. ALS mutual aid
J. Communication and Documentation

VII. Age-Related Variations for Pediatric and Geriatric Assessment and Management
A. Pediatric
    1. Mechanism of injury as pedestrian
    2. Use of PASG (fracture stabilization)
B. Geriatric

VIII. Special Considerations of Abdominal Trauma
A. Sexual Assault
    1. Criminal implications and evidence management
    2. Patient confidentiality
    3. Treat wounds as other soft tissue injuries
B. Vaginal Bleeding Due to Trauma
    1. May be due to penetrating or blunt trauma
    2. Assess to determine pregnancy
    3. Apply sterile absorbent vaginal pad
    4. Determine mechanism of injury
    5. Do not insert gloved fingers for instruments in vagina

Trauma

Orthopedic Trauma

EMT Education Standard

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

EMT-Level Instructional Guideline

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

I. Incidence
   A. Morbidity/Mortality
      1. Upper extremity
      2. Lower extremity
   B. Pediatric Considerations
   C. Geriatric Considerations
   D. Mechanism of Injury
      1. Direct force
      2. Indirect force
      3. Twisting force

II. Anatomy
   A. Skin Layers
   B. Subcutaneous Layers
   C. Extremity Structures
      1. Vascular structure
         a. Venous
         b. Arterial
      2. Muscles
      3. Bony structure
         a. Scapula
         b. Clavicle
         c. Humerus
         d. Radius
         e. Ulna
         f. Carpals
         g. Metacarpals
         h. Phalanges
         i. Pelvis
            i. ileum
            ii. ischium

iii. pubis
iv. acetabulum
j. Femur
i. greater trochanter
ii. lesser trochanter
k. Tibia
l. Fibula
m. Talus
n. Calcaneus
o. Tarsals
p. Metatarsals
q. Phalanges

D. Axial Structures
1. Skull
2. Vertebral column

E. Components of a Long Bone
1. Head
2. Shaft

III. Physiology

A. Function of Musculoskeletal System
1. Support
a. Ligaments
b. Tendons
c. Cartilage
d. Joints
2. Flexion
3. Extension
4. Rotation

IV. Mechanism of Injury

A. Upper Extremity
1. Structures
a. Humerus
b. Radius
c. Ulna
d. Metacarpal
e. Carpal
f. Phalanges
g. Clavicle
h. Joints
2. Direct
3. Indirect
4. Open – hemorrhage significance
5. Closed – hemorrhage significance
6. Sprains/strains
7. Amputations

B. Lower Extremity
   1. Direct
   2. Indirect
   3. Open
   4. Closed
   5. Structures
      a. Pelvis
      b. Femur
      c. Tibia
      d. Fibula
      e. Talus
      f. Calcaneus
      g. Tarsals
      h. Metatarsals
      i. Phalanges

V. Complications
   A. Hemorrhage
   B. Instability
   C. Loss of Tissue
   D. Contamination
   E. Long-Term Disability
   F. Interruption of Blood Supply
   G. Pregnancy With Pelvic Fracture

VI. Descriptions of Fractures
   A. Greenstick
   B. Oblique
   C. Transverse
   D. Comminuted
   E. Spiral

VII. Dislocations
   A. Specific Injuries
      1. Acromio-clavicular
      2. Shoulder
      3. Elbow
      4. Wrist
      5. Metacarpal-phalanx
         a. Hip
         b. Posterior
         c. Anterior
         d. Associated with fracture
      6. Knee
         a. Posterior
         b. Anterior
         c. Patella

7. Foot
8. Hand
9. Ankle

B. Management
1. Scene safety/standard precautions
2. Limb-threatening injury
3. Splinting

VIII. Sprains/Strains
A. Mechanism of Injury
B. Assessment
C. Management

IX. Pelvic Fracture
A. Incidence
B. Mechanism of Injury
C. Signs and Symptoms
D. Assessment
E. Management – PASG (Pelvic Stabilization)

X. General Assessment
A. Scene Safety/Standard Precautions
B. Mechanism of Injury
1. Primary injury
2. Secondary injury

C. Determine Life Threat
1. Life threatening
2. Limb threatening

D. Six P's of Assessment
1. Pain
a. Palpation
b. Movement
2. Pallor
3. Paresthesia
4. Pulses
5. Paralysis
6. Pressure

E. Physical Exam
F. Bleeding
1. External
2. Internal

G. Guarding/Self-Splinting
H. Associated Injuries

XI. General Management
- A. Control Hemorrhage
  - 1. Internal
  - 2. External
    - a. Direct pressure
    - b. Tourniquet
    - c. Traction splint with fracture
- B. General Considerations for Immobilization/Splinting
  - 1. PASG for pelvic fracture
  - 2. Traction for femur fracture
  - 3. Neurologic exam before and after splinting
  - 4. Bandage/dress wounds before immobilization
  - 5. In position found
  - 6. Remove jewelry
  - 7. Above and below the joint for fractures
  - 8. Bones above and below for joints
  - 9. Complications of improper splinting
  - 10. Equipment needed for splinting
- C. Neurologic/Circulatory Examination
  - 1. Motor/sensory
  - 2. Distal pulses
  - 3. Capillary refill
  - 4. Color, temperature
- D. Pain Management
  - 1. Elevate
  - 2. Cold
  - 3. Immobilize injury
- E. Associated Injuries
- F. Transport to Appropriate Facility
- G. Appropriate Communication and Documentation

XII. Specific Injuries
- A. Amputation
  - 1. Control bleeding of stump
    - a. Direct pressure
    - b. Tourniquet
  - 2. Locate and Transport Amputate; Management
    - a. Clean
    - b. Wrap in sterile, moist gauze and place in plastic bag
    - c. Place bag on crushed ice (do not freeze)
    - d. Transport with patient
    - e. Transport to appropriate resource hospital
- B. Sprains/Strains
  - 1. Description
    - a. Sprain
    - b. Strain

2. Difficult to differentiate from a fracture
3. Manage as fracture

C. Pelvic
1. Shock
2. Immobilize on long spine board
3. Apply PASG (pelvic stabilization)

D. Femur
1. Traction splinti
a. types
b. application
2. Long spine board
3. Assess for soft tissue, vascular, and nerve damage

E. Tibia/Fibula
1. Pneumatic splint
2. Long spine board splint
3. Splint to opposite leg

F. Shoulder
1. Sling
2. Swathe

G. Knee
1. Vascular and nerve damage
2. No traction splint

H. Clavicle – Sling

I. Humerus
1. Sling
2. Swathe

J. Forearm
1. Splint
2. Elevate

XIII. Types of Splints
A. Rigid
B. Formable
C. Traction
D. Air
E. Vacuum
F. Pillow/Blanket
G. Short Spine Board
H. Long Spine Board

XIV. Age-Related Variations for Pediatric and Geriatric Assessment and Management
A. Pediatric
B. Geriatric – Osteoporosis (Decreased Bone Density) Increases the Likelihood of Fractures With Minimal Trauma

XV. Sprains/Strains

A. Pathophysiology

1. Review previous knowledge
2. Strain – muscle pull
   a. Stretch, tear or rip of muscle itself
   b. Produced by abnormal contraction
   c. May range from minute separation to complete rupture
3. Sprain
   a. Tearing of stabilizing connective tissue
   b. Injury to ligaments, articular capsule, synovial membrane and tendons crossing the joint
   c. Most vulnerable – ankles, knees, shoulders

B. Special Assessment Findings

1. Review previous knowledge
2. Strains
   a. Sound of a "snap" when muscle tears
   b. Severe weakness of the muscle
   c. Sharp pain immediately with occurrence
   d. Extreme point tenderness
3. Sprains
   a. Edema at joint
   b. Sound of a "snap" with injury
   c. Point tenderness

C. Special Management Considerations

1. Review previous knowledge
2. Strains
   a. Apply cold and pressure
   b. Elastic wrap
   c. Pain relief
   d. Elevation of part
3. Sprains
   a. Apply cold and pressure
   b. Elevation
   c. Elastic wrap to control swelling
   d. Immobilization if needed
   e. Pain management

Trauma

Soft Tissue Trauma

EMT Education Standard

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

EMT-Level Instructional Guideline

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

I. Incidence of Soft Tissue Injury
   A. Mortality
   B. Morbidity

II. Anatomy and Physiology of Soft Tissue Injury
   A. Layers of the Skin
   B. Function of the Skin

III. Closed Soft Tissue Injury
   A. Type of Injuries
      1. Contusion
      2. Hematoma
      3. Crush injuries
   B. Signs and Symptoms
      1. Discoloration
      2. Swelling
      3. Pain
   C. Assessment
      1. Mechanism of injury, suspect underlying organ trauma/injury
      2. Diffuse or generalized soft tissue trauma can be critical
      3. Pulse, movement, sensation distal to injury
   D. Management
      1. Cold
      2. Splinting if necessary

IV. Open Soft Tissue Injury
   A. Type of Injuries
      1. Abrasions
      2. Lacerations and incisions
      3. Avulsions
      4. Bites

5. Impaled objects
6. Amputations
7. Blast injuries/High Pressure
8. Penetrating/Punctures

B. Complications of Soft Tissue Injury
1. Bleeding – shock
2. Pain
3. Infection
a. Mechanisms of infection
b. Risk factors

C. Signs and Symptoms of Open Soft Tissue Injuries
1. Bleeding
2. Shock
3. Pain
4. Hemorrhage
5. Contaminated wounds
6. Impaled objects
7. Loss of extremity
8. Entrance and exit wounds
9. Flap of skin attached

V. General Assessment
A. Safety of Environment / Standard Precautions
B. Airway Patency
C. Respiratory Distress
D. Concepts of Open Wound Dressings/Bandaging
1. Sterile
2. Non-sterile
3. Occlusive
4. Non-occlusive
5. Wet
6. Dry
7. Tourniquet
8. Complications of dressings/bandages

E. Hemorrhage Control
1. Pressure dressing
2. Tourniquets

F. Associated Injuries
1. Airway
2. Face
3. Neck trauma – increased bleeding

VI. Management
A. Airway Management
B. Control Hemorrhage – Dress/Bandage Open Wounds
C. Prevention of Shock

D. Prevent Infection
E. Transport to the Appropriate Facility
F. Bites
    1. Control hemorrhage
    2. Bites often lead to serious infection
G. Avulsions
    1. Never remove skin flap regardless of size
    2. Complete avulsion often has serious infection concerns
    3. Place skin in anatomic position if flat avulsion

VII. Incidence of Burn Injury
A. Morbidity/Mortality
B. Risk Factors

VIII. Anatomy and Physiology of Burns
A. Types of Burns
    1. Thermal
        a. Types
        b. Severity related to
            i. exposure time
            ii. temperature
        c. Enclosed space versus open
        d. Scalds with unusual history patterns may be abuse
    2. Inhalation
        a. Airway obstruction due to swelling may be very rapid
        b. Carbon monoxide inhalation
        c. Enclosed space vs. open space
    3. Chemical
        a. Severity related to
            i. type of chemical
            ii. concentration of chemical
            iii. duration of exposure
        b. Solutions and powders are different
    4. Electrical
        a. External burns may not indicate seriousness of burn
        b. Entrance and exit wounds
        c. May cause cardiac arrest
        d. Lighting strikes may cause cardiac arrest
    5. Radiation
B. Depth Classification of Burns
    1. Superficial
    2. Partial-thickness
    3. Full-thickness
C. Body Surface Area of Burns
    1. Rule of nines
    2. Rule of ones (palm)

D. Severity of Burns
    1. Minor
    2. Moderate
    3. Severe

IX. Complications of Burn Injuries
A. Infection
B. Shock
C. Hypoxia
D. Airway Obstruction
E. Hypothermia
F. Hypovolemia
G. Complications of Circumferential Burns

X. General Assessment of Burn Injuries
A. Scene Safety/Standard Precautions
    1. Identification of burn type
    2. Possibility of inhalation injury
B. Airway Patency
C. Respiratory Distress
D. Classification of Burn Depth
E. Percentage of Body Surface Area Burned
F. Severity

XI. General Management
A. Stop the Burning
B. Airway Management
C. Respiratory Distress
    1. Administer high concentration oxygen
    2. Assist ventilation if indicated
    3. Position with head elevated if spine injury not suspected
D. Circulatory
E. Dry, Sterile, Non-Adherent Dressing
    1. After initial cooling of burn
    2. Moist dressing if burn less than ten percent body surface area
F. Remove Jewelry and Clothing
G. Treat Shock
H. Prevent Hypothermia
I. Transportation to Appropriate Facility
    1. ALS mutual aid
    2. Criteria for burn center
J. Pediatric Considerations
    1. Pediatric
        a. Rule of nines
        b. Increased risk of hypothermia
    2. Abuse
K. Geriatric Considerations

XII. Specific Burn Injury Management Considerations

A. Thermal

1. Complete general management
2. May be associated with an inhalation injury
3. Large burns may cause hypovolemia and hypothermia
4. Cool small burns or those remaining hot (patient who has just been rescued from fire)
5. Dry dressing help prevent infection and provide comfort
6. Time in contact with heat increases damage

B. Inhalation

1. Complications are related to toxic chemicals within inhaled air
   a. Carbon monoxide
   b. Cyanide
   c. Other toxic gasses
2. Edema of mucosa of airway can be rapid -- consider ALS backup if signs and symptoms of edema are present, such as:
   a. Hoarseness
   b. Singed nasal or facial hair
   c. Burns of face
   d. Carbon in sputum
3. Burns in enclosed spaces without ventilation cause inhalation injuries

C. Chemical

1. Liquid chemicals – flush with water
2. Dry powder chemicals and need brushed off to remove chemicals
3. Chemical burns treatments can be specific to the burning agent and labels should be read
4. Burns at industrial sites may have experts available on scene

D. Electrical

1. The type of electric current, amperage and volts, have effect on seriousness of burns
2. No patient should be touched while in contact with current
3. Sometimes electric current crosses the chest and causes cardiac arrest or arrhythmias
4. Many underlying injuries to organs and the nervous system may be present

E. Radiation – radiation burns require special rescue techniques

XIII. Age-Related Variations

A. Pediatric

1. Percentage of surface area in a burn patient
2. Alteration in calculating the burned area

B. Geriatrics

Trauma

Head, Facial, Neck, and Spine Trauma

EMT Education Standard

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

EMT-Level Instructional Guideline

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

I. Introduction
   A. Incidence
      1. Head/scalp
      2. Face injury
      3. Neck injury
   B. Mechanisms of Head, Face, and Neck (Non-Spine) Injury
      1. Motor vehicle crashes
      2. Sports
      3. Falls
      4. Penetrating trauma
      5. Blunt trauma
   C. Morbidity and Mortality
   D. Associated Injuries
      1. Airway compromise
      2. Cervical spine injury

II. Review of Anatomy and Physiology of the Head, Face, and Neck
   A. Arteries
   B. Veins
   C. Nerves
   D. Bones
      1. Nasal
      2. Zygoma/Zygomatic arch
      3. Orbital
      4. Maxilla
      5. Mandible
      6. Skull
   E. Scalp
      1. Hair
      2. Subcutaneous tissue
      3. Muscle

F. Mouth/Throat
    1. Airway
        a. Oropharynx
        b. Larynx
        c. Trachea
        d. Tongue
        e. Teeth
G. Neck
    1. Blood vessels
        a. Carotid arteries
        b. Jugular veins
    2. Airway – trachea
    3. Gastrointestinal – esophagus
H. Eye
    1. Bony orbit
    2. Sclera
    3. Cornea
    4. Iris
    5. Pupil
    6. Lens
    7. Retina
    8. Optic nerve

III. General Patient Assessment
A. Scene Size-Up
B. Primary Survey
    1. Airway
    2. Ventilation and oxygenation
    3. Circulation
    4. Disability
        a. Level of consciousness
        b. Motor/sensory response
        c. Pupils – anisocoria
    5. Expose
    6. Identify and manage life threats

IV. Specific Injuries to Head, Face, and Neck
A. Scalp
    1. Assessment
        a. Open wounds
        b. Closed wounds
        c. Consider underlying injury
    2. Signs and Symptoms
        a. Open wounds bleed heavily
        b. Direct pressure is complicated with underlying skull injury

c. Injuries above the ears may be more serious
d. Battle's sign is a delayed finding of basal skull fracture

3. Management considerations
a. Apply pressure to control bleeding
b. Dressings and bandages should not close mouth

B. Facial Injuries
1. Types
a. Soft tissue injuries
b. Fractures of facial bones
c. Eye injuries
d. Oral/dental injuries
i. mandibular fractures
ii. maxillar fractures
iii. tooth avulsion

2. Signs/symptoms
a. Soft tissue injuries are similar to others, but swelling may be more severe
b. Facial bones may fracture causing airway and ventilation obstruction
c. Eye injuries suffer soft tissue type injuries, abrasions, lacerations, punctures, chemical burns, etc.
d. Eye injuries may cause vision disturbances
e. Eyes injured with chemicals need flushing with copious amounts of water
f. Excessive pressure on the eye may "blow out" bones in the orbit
g. Nasal fractures may cause bleeding
h. Oral injuries may cause airway management complications

3. Assessment considerations in facial and eye injuries
a. Inspection
i. open wounds
ii. swelling
iii. deformity of bones
iv. eye clarity without foreign objects
v. eye symmetry
vi. bone alignment in anatomical position
b. Palpation – facial bones
c. Eye examination
i. follows finger up, down, lateral
ii. can read regular print
iii. no blood visible in iris area

4. Management considerations in facial and eye injuries
a. Maintain patent airway
b. Nasopharyngeal airways are contraindicated
c. May need frequent suctioning
d. Bring broken teeth to hospital with patient
e. Flush eyes contaminated with chemicals with copious amounts of water

f. Control simple nose bleeds by pinching nostrils
g. Eye injuries require patching of both eyes
h. Stabilize impaled objects in the eye
i. Impaled objects in cheeks may be removed if bleeding obstructs the airway
j. Patients with these injuries may be more comfortable sitting up – if no risk of spinal injury
k. Bandaging should not occlude the mouth

C. Neck Injuries (Non-Spinal)
1. Types of Injuries
a. Open wounds
b. Blunt trauma
2. Considerations in neck injuries
a. May have underlying spinal injury
b. Open wounds may bleed profusely and cause death
c. Airway passages may be obstructed
3. Assessment considerations in neck injuries
a. Monitor airway throughout care
b. Patient may not be able to swallow with esophageal injury
c. Swelling may be related to air escape under the skin which can "crackle" with digital pressure
d. Larynx injuries will cause changes in voice sounds
e. Air may enter the circulatory system if there is penetrating injury to a large blood vessel in the neck
4. Management considerations in neck injuries
a. Single digital pressure (gloves on) to control bleeding of carotid artery or jugular veins may be necessary
b. ALS intercept or air medical transport may be necessary in severe cases of airway compromise
c. Occlusive dressing for large vessel wounds (after bleeding controlled) – to prevent air entry into circulatory system

D. Nasal Fractures
1. Mechanism of Injury
a. Blunt
b. Penetrating
2. Assessment – epistaxis
3. Management

E. Eye/Orbital
1. Types of Vision
a. Central
b. Peripheral
2. Types of Injury
a. Penetrating
i. abrasions – cornea
ii. foreign body
iii. lacerations – eyelid
b. Blunt

c. Burns to cornea
    i. acid
    ii. alkali
    iii. ultraviolet
d. Blast
e. Avulsions

3. Assessment
4. Management
    a. Airway
    b. Control bleeding
        i. blunt injury
            a) positioning
            b) bandage
                i) one/both
                ii) no pressure
        ii. penetrating
            a) positioning
            b) moist bandage
            c) stabilize impaled object
            d) patch both eyes
        iii. burns
            a) acid
            b) alkali
    c. Foreign Body

F. Dental
1. Mechanism of Injury
2. Assessment
3. Management – bring tooth with patient

G. Laryngeal Injuries
1. Definition
2. Mechanism of Injury
    a. Blunt
    b. Penetrating – do not remove
3. Signs/symptoms
4. Assessment
    a. Neck bruising, hematoma, or bleeding
    b. Cyanotic, pale skin
    c. Sputum in wound
    d. Subcutaneous air
5. Associated Injuries
    a. Soft tissue and fascia
    b. Cervical spine injury

6. Management
    a. Oxygenation and ventilation
    b. Cervical immobilization (avoid rigid collars)
    c. Stabilize impaled objects if not obstructing airway

H. Head Injury
1. Definition
2. Mechanism of injury
   a. Penetrating
   b. Blunt
   c. Open
   d. Closed
3. Signs/symptoms of fractures and other injuries
   a. Cerebral spinal fluid – clear drainage from ears or nose
   b. Discoloration around eyes
   c. Discoloration around ears
   d. Skull deformity
   e. Decreased mentation
   f. Irregular breathing pattern
   g. Unequal pupils
   h. Nausea and/or vomiting
   i. Seizure activity
   j. Elevated blood pressure
   k. Slow heart rate
4. Assessment
   a. Airway patency
   b. Ventilation
   c. Vital signs
   d. Pupils
   e. Neurological exam
5. Associated injuries
6. Management
   a. Standard precautions
   b. Manage airway
   c. Administer oxygen
   d. Assist ventilation if indicated
   e. Immobilize spine
   f. Shock prevention
      i. control bleeding
      ii. body positioning

I. Brain Injury
1. Definition
2. Signs/Symptoms
3. Mechanism of Injury
   a. Penetrating
   b. Blunt

4. Pathophysiology of head/brain injury
   a. Increased intracranial pressure (ICP)
   b. Direct or indirect injury
      i. edema
      ii. bleeding
      iii. hypotension

5. Types of Injury
   a. Intracranial hematoma
      i. epidural
         a) signs/symptoms
         b) assessment
         c) management
      ii. subdural
         a) signs/symptoms
         b) assessment
         c) management
      iii. intracerebral
         a) signs/symptoms
         b) assessment
         c) management
      iv. subarachnoid
         a) signs/symptoms
         b) assessment
         c) management
   b. Concussion
      i. signs/symptoms
         a) delayed motor and verbal responses
         b) inability to focus attention
         c) lack of coordination
         d) disorientation
         e) inappropriate emotional responses
         f) memory deficit
         g) inability to recall simple concepts, words
         h) nausea/vomiting
         i) headache
      ii. assessment
      iii. management
6. Assessment
   a. Cerebral cortices
   b. Hypothalamus – vomiting
   c. Brain Stem
      i. vagus nerve pressure – bradycardia
      ii. respiratory centers
      iii. posturing
      iv. seizures
   d. Indicators of increasing ICP
      i. decreased level of consciousness
      ii. increased blood pressure and slowing pulse rate
      iii. pupils still reactive
      iv. Cheyne Stokes respirations
      v. initially localize to painful stimuli
      vi. all effects reversible at this stage

vii. middle brain stem involved
a) wide pulse pressure and bradycardia
b) pupils nonreactive or sluggish
c) central neurogenic hyperventilation
d) extension
viii. lower portion of brain stem involved/medulla
a) pupil blown – same side as injury
b) ataxic respirations
c) flaccid response to painful stimuli
d) pulse rate
e) diminished blood pressure
ix. Cushing's phenomenon
e. Glasgow coma scale
i. head injury classified according to score
a) mild – 13-15
b) moderate – 8-12
c) severe – <8
f. Vital signs
g. Bilateral pupil size and reaction – fixed and dilated
h. History of unconsciousness or amnesia of event
i. Hypotension
j. Hypoxemia
k. Pediatric considerations – pre-verbal Glasgow coma scale
l. Geriatric considerations
7. Management
a. Suspect cervical spine injury based on mechanism of injury at scene assessment
i. management of a patient wearing a helmet – consideration for removal of helmet
ii. types of helmets
b. Secure airway if patient cannot maintain an adequate airway
c. Administer oxygen
d. Assist ventilation if indicated
e. Control external bleeding
f. Disability – repeated assessment crucial
g. Position – elevate head of backboard 30 degrees
h. Transport considerations
i. identify need for rapid intervention and transportation
ii. trauma center
iii. use of lights and sirens
i. Psychological support
j. Effective communication and appropriate documentation

V. Age-Related Variations
A. Pediatric -- modifications for Glasgow coma scale
B. Geriatric

Trauma

Nervous System Trauma

EMT Education Standard

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

EMT-Level Instructional Guideline

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

I. Incidence
   A. Morbidity
   B. Mortality

II. Anatomy and Physiology of the Brain and Spine
   A. Spine
      1. Spinous process
      2. Cervical
      3. Thoracic
      4. Lumbar
      5. Spinal Fluid
   B. Spinal Cord
   C. Brain
      1. Skull
      2. Meninges
         a. Dura mater
         b. Arachnoid mater
         c. Pia mater
      3. Gray matter – composed of nerve cells
      4. White matter – covered nerve pathways that conduct messages of the brain
      5. Brain stem – center for involuntary functions, temperature regulation, respiratory and heart rate, nerve function transmissions
      6. Cerebrum – main part of brain, divided into two hemispheres, with four lobes
      7. Cerebellum – center for equilibrium and coordination
      8. Meninges – coverings of the brain
      9. Cerebral spinal fluid
   D. Types of Skull Fractures
      1. Basal
      2. Compressed

3. Open
4. Linear

E. Types of Brain injuries
1. Concussion – temporary disruption to brain without injury due to closed trauma
2. Contusion – bruise of brain matter, may be diffuse or localized to one area
3. Cerebral laceration
4. Space occupying lesions
a. Epidural bleed – typically arterial with high emergent risk
b. Subdural – typically venous, may be acute or chronic
5. Penetrating wounds

III. General Assessment Considerations for Brain Trauma Patients

A. Airway and Ventilation
1. Maintain airway
2. Assess for adequate ventilation

B. Mechanism of Injury
1. Consider the potential for blunt head trauma based on mechanism of injury
2. Assess the need to remove the helmet with proper spinal considerations if airway compromise or bleeding under the helmet is present

C. Spinal Immobilization
1. In patients with head injuries with altered mental status
2. Mechanism of injury that suggests the possibility of trauma to the spine

D. Respiratory Status -- brain injuries can cause irregular breathing patterns due to injuries affecting the brain stem

E. Complete a Neurological Exam
1. Appearance and behavior
a. Alert
b. Responds to verbal stimuli
c. Responds to painful stimuli
d. Unresponsive
2. Observe posture and motor behavior – appropriate movement
3. Facial expression
4. Speech and language
5. Thoughts and perceptions
a. Logical
b. Ability to make decisions
6. Memory and attention
a. Assess orientation
i. person
ii. place
iii. time
iv. purpose
b. Knowledge of recent events

7. Pupils
    a. Equal
    b. React to light
8. Vital signs
    a. Blood pressure
        i. systolic pressure increase
        ii. hypotension is associated with poorer outcomes in head injured patients
    b. Pulse rate – may be slower than normal if severe head injury

F. Management Considerations With Brain Trauma
1. Maintain airway throughout care
2. Administer oxygen by non-rebreather mask – maintain oxygen saturation >90 percent at all times
3. Nasopharyngeal airways should not be used
4. Assist ventilation if indicated – avoid hyperventilation; except in specific circumstances

G. Transport Considerations
1. Head trauma patients with impaired airway or ventilation, open wounds, abnormal vital signs, or who do not respond to painful stimuli may need rapid extrication
2. Head trauma patients must be transported to appropriate trauma centers
3. Head trauma patients may deteriorate rapidly and may need air medical transport
4. Adequate airway, ventilation, and oxygenation are critical to the outcome of head trauma patients
5. Head trauma patients frequently vomit – keep suction available
6. Head trauma patient frequently have seizures

H. Refer to Brain Injury Foundation Guidelines

IV. Age-Related Variations for Pediatric and Geriatric Assessment and Management of Brain Injury
A. Pediatric
B. Geriatric

V. Spinal Cord Injuries
A. Types of Associated Spinal Injuries
1. Fractures
2. Dislocations
3. Open wounds
4. Flexion
5. Extension

B. General Assessment Considerations in Spinal Trauma
1. Often present with other injuries
    a. Head trauma
    b. Penetrating trauma
        i. anterior
        ii. posterior

c. Direct blunt trauma
d. Falls or diving injuries
e. Car crashes and multi-system trauma
f. Rapid deceleration injuries

2. Neurological examination considerations
   a. Movement of extremities
      i. absent or weak
      ii. note level of impairment
   b. Respiratory ability
      i. chest wall movement
      ii. abdominal Excursion
   c. Sensation
      i. present throughout body
      ii. absent – note the specific level of impairment
      iii. altered sensation distal to injury – jingling, numbness, "electric shocks"
   d. Pain and tenderness present at site
   e. Vital signs
      i. Hypotension may be present with cervical or high thoracic spine injuries;
      ii. Heart rate may be slow or fail to increase in response to hypotension
   f. Other signs or symptoms associated with spinal cord trauma
      i. priapism
      ii. inability to maintain body temperature
      iii. loss of bowel or bladder control
3. History for patient with suspected spinal trauma

C. General Management Considerations With Spinal Trauma
1. Manual immobilization of spine when airway opened
2. Immobilization principles
3. Log-roll patient with suspected spinal trauma to move or examine back
4. Cervical collars
   a. Rigid
   b. Proper size
5. Seated patient spinal immobilization
6. Standing patient spinal immobilization
7. Lifting and moving patient with suspected spinal injury
8. Rapid moves for patient with suspected spinal injury
9. Helmet removal if present with airway complications
10. Consideration for pneumatic antishock garment use

VI. Age-Related Variations for Pediatric and Geriatric Assessment and Management of Spinal Injury

A. Pediatric
1. Head size and anatomical positioning during immobilization
2. Use of child safety seats

B. Geriatric
   1. Unusual spinal anatomy due to aging
   2. Special modifications of spinal immobilization techniques

Trauma

Special Considerations in Trauma

EMT Education Standard

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

EMT-Level Instructional Guideline

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

I. Trauma in Pregnancy
   A. Special Unique Considerations for Pregnant Patient Involved in Trauma
      1. Mechanism of injury
         a. Pregnant patients can sustain all types of trauma
         b. Susceptible to falls and physical abuse
      2. Fetal considerations – trauma to an expectant mother can have effects on fetal health
   B. Special Anatomy, Physiology, and Pathophysiology Considerations
      1. Cardiovascular
         a. Increase to total vascular volume
         b. Increase in maternal heart rate in third trimester
         c. Shock in a third trimester patient may be difficult to detect
         d. Third trimester fetus size can affect venous return in patients lying flat on their backs
         e. Decreased gastrointestinal motility increases risk of vomiting and aspiration after trauma
   C. Unique Types of Injuries and Conditions of Concern for Pregnant Patients Involved in Trauma
      1. Fetal distress due to hypoxia or hypovolemia/shock
      2. Separation of the placenta from the uterine wall
         a. Abdominal pain
         b. Vaginal bleeding often present
         c. High risk of fetal death
      3. Fetal injury from penetrating trauma
      4. Seat belts
      5. Cardiac arrest due to trauma
   D. Unique Assessment Considerations for Pregnant Patients Involved in Trauma
      1. Two patients to consider
         a. Mother
            i. immobilize and tilt the long spine board to the left if spinal injury is suspected

ii. internal blood loss is difficult to assess as signs of shock are masked
iii. vaginal exam may be present
iv. increased risk of aspiration from decreased gastrointestinal motility

b. Fetus
i. size of fetus is important (number of weeks pregnant)
ii. difficult to assess so treat mother aggressively if severe trauma

E. Unique Management Considerations for the Pregnant Patients Involved in Trauma
1. Airway, ventilation, and oxygenation
a. Anticipate vomiting – have suction available
b. Assure bilateral breath sounds are present
c. Keep oxygenation levels high (100%) – administer oxygen by non-rebreather mask
d. Assist ventilation if inadequate
2. Circulation
3. Transport considerations
a. Transport on left side
b. Major trauma may need ALS intercept or air medical resources
c. Trauma centers – inform them that pregnant patient is involved in the trauma

II. Trauma in the Pediatric Patient
A. Special Unique Considerations for Pediatric Patient Involved in Trauma
1. Vehicle crashes
2. Pedestrian versus vehicle collisions
3. Drowning
4. Burns
5. Falls
6. Penetrating trauma
B. Unique Anatomy, Physiology, and Pathophysiology Considerations of Injured Pediatric Patients
1. Heavy head with weak neck muscles in children increases risk of cervical spine injury
2. Chest wall flexibility produces flail chest
C. Unique Assessment Considerations for a Pediatric Patient Who Has Sustained Trauma
1. Pediatric assessment triangle
a. Appearance
b. Work of breathing
c. Circulation
2. Airway, ventilation, oxygenation
a. Respiratory rates vary by age
b. Accessory muscle use more prominent during respiratory distress
3. Vital signs
a. Assess brachial pulse in infants

b. Pulse rates vary by age
c. Slow pulse rate indicates hypoxia
d. Blood pressure for age 3 or younger unreliable
e. Blood pressure varies by age
f. Normal blood pressure may be present in compensated shock

D. Unique Management Considerations for Pediatric Patients Involved in Trauma
1. Manage hypovolemia and shock as for adults
2. Shaken baby syndrome may cause brain trauma
3. Prevent hypothermia in shock
4. Transport to appropriate facility
5. Pad beneath child from shoulders to hips during cervical immobilization to prevent flexion of the neck
6. Ventilate bradycardic pediatric patient

III. Trauma in the Elderly Patient

A. Special Considerations for Geriatric Patients Involved in Trauma
1. Vehicle crashes
2. Pedestrian versus vehicle collisions
3. Fall
4. Burns
5. Penetrating trauma
6. Elder abuse

B. Unique Anatomy, Physiology, and Pathophysiology Considerations of Injured Geriatric Patients
1. Changes in pulmonary, cardiovascular, neurologic, and musculoskeletal systems make older patients susceptible to trauma
2. Circulation changes lead to inability to maintain normal vital signs during hemorrhage, blood pressure drops sooner
3. Multiple medications are more common and may affect
a. Assessment, especially vital signs
b. Blood clotting
4. Brain shrinks leading to higher risk of cerebral bleeding following head trauma
5. Skeletal changes cause curvature of the upper spine that may require padding during spinal immobilization
6. Loss of strength, sensory impairment, and medical illness increase risk of falls

C. Unique Assessment Considerations for Injured Geriatric Patients
1. Airway
a. Dentures may cause airway obstruction
b. May have decrease in cough reflex so suctioning is important
c. Curvature of the spine may require padding to keep patient supine
2. Breathing
a. Use pulse oximetry to monitor oxygenation
b. Minor chest trauma can cause lung injury
3. Circulation

D. Unique Management Considerations for Injured Geriatric Patients
   1. Suctioning is important in elderly due to decrease cough reflex
   2. Decrease muscle size in the abdomen may mask abdominal trauma
   3. Prevent hypothermia
   4. Broken bones are common – traction splints are not used to treat hip fractures
   5. Falls leading to trauma must be investigated as to the reason for the fall

IV. Trauma in the Cognitively Impaired Patient
A. Unique Considerations for Injured Cognitively Impaired Patients
   1. Types of cognitive impairment
      a. Alzheimer's disease
      b. Vascular dementia
      c. Down's syndrome
      d. Autistic disorders
      e. Brain injury
      f. Stroke
   2. Mechanism of injury – cognitively impaired patients are more susceptible to trauma
B. Unique Anatomy, Physiology, and Pathophysiology Considerations for Injured Cognitively Impaired Patients
   1. Sensory loss related to aging and disease may increase risk of injury and alter the patient's response to injury
   2. Musculoskeletal strength due to aging or impairment
   3. Memory loss with Alzheimer's disease will alter patient assessment
   4. Cardiovascular changes with dementia
C. Unique Assessment Consideration for Cognitive Impaired Patients Involved in Trauma
   1. Poor historians of past medical history or events of trauma
   2. Pain perception may be altered
   3. Psychological implications of trauma may be different
   4. Patient may be bed ridden or under nursing home care
D. Unique Management Consideration for Cognitively Impaired Patients Involved in Trauma
   1. Cognitively impaired patient special care
   2. Involve usual care givers in emergency treatment

Trauma

Environmental Emergencies

EMT Education Standard

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

EMT-Level Instructional Guideline

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

I. Submersion Incidents
   A. Drowning
      1. Definition
      2. Incidence
      3. Predictors of morbidity and mortality
   B. Types
      1. Fresh water
      2. Salt water
   C. Pathophysiology
      1. Little difference in patient lungs regardless of what type of water submersion occurred
      2. Submersion in cold water results in better survival than warm water
      3. Age is a factor due to cardiovascular health
      4. Duration under water effects outcome
      5. Submersion in very cold water can produce cardiac disturbances
      6. Hypoxia from submersion is major factor in death
      7. Diving in shallow water can cause spinal trauma
      8. Prolonged hypoxia causes death of brain tissue
   D. Unique Signs and Symptoms
      1. Airway – obstructed with water immediately after rescue
      2. Breathing
         a. May be coughing if early rescue
         b. Agonal breaths if prolonged submersion
         c. Respiratory arrest if very prolonged submersion
      3. Circulation
         a. May be in cardiac arrest
         b. Skin is cyanotic
         c. Skin may be cold
   E. Assessment Considerations
      1. Airway, ventilation, and oxygenation
         a. Oxygen saturation may be difficult to obtain if patient is cold

b. Use spinal precautions when opening airway to assess if risk of spinal trauma is possible
c. Auscultate breath sounds
2. Assess for presence of other injuries
3. Obtain past medical history

F. Management Considerations
1. Airway, ventilation, and oxygenation
a. Suction and maintain open airway
i. anticipate vomiting
ii. position lateral recumbent if no risk of spinal injury
b. Ventilate with bag-mask if impaired ventilation or respiratory arrest
c. Administer oxygen by non-rebreather mask if breathing is adequate
2. Circulation
a. If cardiac arrest is present, refer to current American Heart Association guidelines
b. Defibrillate with AED if indicated (refer to current American Heart Association guidelines)
3. Transport Considerations
a. Transport to appropriate facility
b. All patients who had submersion injury with any report of signs and symptoms during or after submersion need transport to the hospital

II. Temperature-Related Illness
A. Incidents
1. Temperature-related illness
a. Cold-related illness
b. Heat-related illness
2. How the body loses heat
a. Conduction
b. Convection
c. Radiation
d. Evaporation
e. Respiration
3. Type of temperature-related illness
a. Generalized cold injury (hypothermia)
b. Localized cold injury
c. Generalized heat injury – may affect full body or muscle groups

B. Pathophysiology
1. Cold-related injuries
a. Low environmental temperatures generalized exposure
i. factors that contribute to risk of cold injury
a) clothing of the patient
b) age
c) time of exposure

d) alcohol or other medication ingestion
e) suicide
f) activity level of the victim
g) pre-existing injury or illness

ii. environment factors that contribute to risk of cold injury
a) ambient temperature
b) wind speed
c) moisture

b. Local cold exposure
i. local exposure of body appendage to cold – ears, fingers, and toes very susceptible
ii. ice crystals form
iii. impairs local blood flow
iv. temporary or permanent tissue damage – may lead to amputation

2. Heat-related illness
a. Environmental factors that contribute to risk of heat-related illness
i. ambient temperature
ii. humidity

b. Patient factors that contribute to risk of heat injury
i. no acclimation to heat
ii. medical illness or injury
iii. age
iv. exertion
v. alcohol or other medication use

c. Patient with moist, pale, cool skin – excessive fluid and salt loss
d. Patient with hot, dry skin
i. true emergency
ii. seen on hot, humid days in patients with fluid and salt loss
iii. body unable to regulate temperature

e. Patient with hot, moist skin
i. true emergency
ii. seen when extreme exertion exceeds the body's ability to regulate temperature

C. Signs and Symptoms
1. Cold-related illness – (generalized) hypothermia
a. Decreased level of consciousness
b. Impaired motor function
i. rigidity
ii. altered balance

c. Shivering
i. muscle contractions help to increase body temperature
ii. temperature will drop quickly when shivering stops

d. Slow pulse and breathing in later stages
e. Cool abdominal skin below clothing
f. Extreme hypothermia
i. cardiac insufficiency

ii. may have no palpable pulse
iii. cardiac arrest

2. Cold-related illness (localized)
   a. Frozen extremity
   b. Loss of color
   c. Loss of movement
   d. Pain
3. Heat-related illness (moist, pale skin)
   a. Muscle cramps
   b. Change in level of consciousness, dizziness
   c. Weakness
   d. Weak, rapid pulse
   e. Nausea and vomiting
   f. Apply pulse oximetry
4. Heat-related illness (hot skin)
   a. Little or no perspiration – in exertional heat stroke the skin may be sweaty and hot
   b. Loss of consciousness
   c. Rapid breathing
   d. Rapid pulse
   e. Seizures

D. Management Considerations
1. Cold-related illness – (generalized) hypothermia
   a. Move the patient from the cold environment
   b. Remove any wet clothing
   c. Administer oxygen – warmed and humidified if available
   d. Cover with warm blankets
   e. Rewarm with hot packs in groin, arm pits – use caution to avoid burns
   f. Provide warm clear liquids if conscious and not vomiting
   g. Rewarm slowly
   h. Transport
   i. Passive rewarming is best delivered at the appropriate facility
   j. Handle gently to decrease risk of ventricular fibrillation
   k. If unconscious and in cardiac arrest follow AHA recommendations for CPR
2. Cold-related illness (localized)
   a. Move patient out of cold environment
   b. Administer oxygen
   c. Consider active rewarming if no chance of re-injury
      i. immerse part in tepid (100 – 105 degrees Farenheit) water
      ii. after rewarming, apply sterile dressings
      iii. keep patient warm
      iv. transport as soon as possible
3. Heat-related illness, with moist, pale, cool skin
   a. Remove from hot environment
   b. Administer oxygen

c. Remove clothing
d. Splash the patient with cool water

4. Heat-related illness with hot skin
a. Remove patient from hot environment
b. Administer high concentration oxygen
c. Assist ventilation if inadequate
d. Cool packs to armpits, groin, neck
e. Transport immediately
f. This is true emergency

III. Bites and Envenomations

A. Injuries of Concern
1. Spider bites
2. Snake bites
3. Hymenoptera (bees, wasps, ants, yellow jackets)

B. Pathophysiology of Bites and Envenomations
1. Spider bites (black widow) -- inject neurotoxins
2. Snake bites -- rattlesnake is most common in United States
a. toxins affect blood and nervous system both at the bite site and systemically
b. patient age and size cause different effects
c. amount of toxin injected is related to toxicity (often none at all)
d. initial 6-8 hours of care is essential
3. Hymenoptera
a. Cause allergic reactions in sensitized (allergic) people
b. May lead to anaphylactic response

C. Signs and Symptoms
1. Spider bite (black widow)
a. Localized swelling initially
b. Chest or abdominal pain depending on bite site
c. Dangerous in children, may be fatal
2. Rattlesnake bite
a. Time of bite to care is important
b. Pain at site
c. Progressive weakness
d. Nausea and vomiting
e. Seizures
f. Vision problems
g. Changes in level of consciousness
3. Bee, wasp, and other stings
a. Pain at site
b. Swelling
c. Signs of allergic reaction
d. Signs of anaphylaxis

D. Unique Management Considers of Bites and Stings
1. Spider bite (black widow)
a. Ice pack to area of bite

b. Clean wound with soap and water
c. Transport immediately with supportive care

2. Rattlesnake bite
   a. Note time of bite to transport
   b. Slow venous return
   c. Keep patient calm
   d. Immobilize extremity
   e. Position extremity
   f. Clean bite site with soap and water
   g. Identify snake if possible
3. Bees, wasps, and other stings
   a. Remove stinger or venom sac
   b. If anaphylaxis develops follow protocol

IV. Diving Emergencies (Dysbarism)

A. Mechanism of Injury
   1. SCUBA diving at greater depths for long periods of time
   2. Repeated dives at depth on the same day

B. Pathophysiology
   1. Diver remains at depth too long
   2. Compressed air in blood at depth expands upon ascent, turning into bubbles in blood which obstruct blood flow

C. Signs and Symptoms
   1. Occur after the patient raises to the surface too fast following dive at depths
   2. Cyanosis
   3. Cough
   4. Respiratory distress
   5. Pain in joints

D. Unique Management Considerations
   1. Administer high-concentration oxygen
   2. Transport rapidly for recompression therapy at the appropriate facility

V. Electrical

A. Electrical
   1. Skin wounds may not indicate seriousness of burn
   2. Entrance and exit wounds
   3. May cause cardiac arrest
   4. Lighting strikes may cause cardiac arrest

VI. Radiation

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

Trauma

Multi-System Trauma

EMT Education Standard

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

EMT-Level Instructional Guideline

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

I. Kinematics of Trauma
   A. Definition
      1. Looking at a trauma scene and attempting to predict what injuries might have resulted based on an evaluation of the motion involved
      2. Kinetic energy – function of weight of an item and its speed – speed is the most import variable
      3. Blunt trauma
         a. Objects collide during crashes
            i. car with object
            ii. patient with part of car
            iii. organs collide inside body
         b. Unbelted drivers and front seat passengers suffer multi-system trauma due to multiple collisions of the body and organs
         c. Direction of the force has impact on type of injury
            i. frontal impacts
            ii. rear impacts
            iii. side impacts
            iv. rotational impacts
            v. rollovers
      4. Deceleration Injuries
      5. Penetrating Trauma
         a. Damage is influenced by
            i. distance from shooter
            ii. size of bullet
            iii. fragmentation
            iv. cavitation
            v. velocity of weapon
         b. Energy levels have effect
            i. low energy (stabbings)
            ii. medium energy (handguns, some rifles)
            iii. high energy (military weapons)

c. Signs and symptoms will vary according to the organ struck
    i. head
    ii. chest
    iii. abdomen
    iv. extremities

II. Multi-System Trauma
A. Definition
1. Almost all trauma affects more than one system
2. Typically a patient considered to have "multi-system trauma" has more than one major system or organ involved
    a. Head and spinal trauma
    b. Chest and abdominal trauma
    c. Chest and multiple extremity trauma
3. Multi-system trauma treatment involves a team of physicians to treat the patient. This may include specialists such as neurosurgeons, thoracic surgeons, and orthopedic surgeons
4. Multi-system trauma has a high level of morbidity and mortality
B. The Golden Principles of Out-of-Hospital Trauma Care
1. Safety of rescue personnel and patient
2. Determination of additional resources
3. Kinematics
    a. Mechanism of injury
    b. High index of suspicion
4. Identify and manage life threats
5. Airway management while maintaining cervical spinal immobilization
6. Support ventilation and oxygenation – oxygen saturation greater than 95 percent
7. Control external hemorrhage
8. Basic shock therapy
    a. Maintain normal body temperature
    b. Splint musculoskeletal injuries
9. Maintain spinal immobilization on long spine board
    a. Standing patients
    b. Sitting patients
    c. Rapid transport considerations
    d. Prone patients
    e. Supine patients
10. Transportation considerations
    a. Golden period
    b. Closest appropriate facility
    c. 'Platinum 10 Minutes'
11. Obtain medical history
12. Secondary survey after treatment of life threats
C. Critical Thinking in Multi-System Trauma Care
1. Airway, ventilation, and oxygenation are key elements to success
    a. Airway must be opened and clear throughout care

b. Adequate ventilation must occur – patients with low minute volume need assisted ventilation
c. Administration of high concentrations of oxygen

2. Oxygenation cannot occur when patients are bleeding profusely
   a. Stop arterial bleeding rapidly
   b. Consider use of tourniquets if severe extremity bleeding cannot be controlled with direct pressure
3. Sequence of treating patients
   a. Not all treatments are linear. At times care must be adjusted depending on the needs of the patient.
   b. Example:
      i. control arterial bleeding in an awake patient first
      ii. much care can be done en route
4. Rapid transport is essential
   a. The definitive care for multi-system trauma may be surgery which cannot be done in the field
   b. On scene time is critical and should not be delayed
   c. Rapid extrication should be considered for critically injured patients
   d. Use of advanced life support intercept and air medical resources in a multi-trauma patient should be highly considered
   e. Early notification of hospital resources is essential
   f. Transport to the appropriate facility is critical – know your local trauma system capabilities
5. Backboards – serve as entire body splints when patients are appropriately secure in unstable patients
6. Personal safety
   a. Most important when arriving on scene, and throughout care, an injured EMT can not provide care
   b. Be sure to assess your environment
      i. passing automobiles
      ii. hazardous situation
      iii. hostile environments
      iv. unsecured crime scenes
      v. suicide patients who may become homicidal
7. Experience
   a. Do not develop "tunnel" vision by focusing on patients who complain of pain and are screaming for your help while other quiet patients who may be hypoxic or bleeding internally can not call out for help because of decreases in level of consciousness
   b. Sometimes an obvious injury does not have the most potential for harm
   c. Trauma care is a leading cause of death of young people. It is essential to keep important care principles in mind during management

III. Specific Injuries Related to Multi-System Trauma

A. Blast Injuries

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

Special Patient Populations

Obstetrics

EMT Education Standard

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

EMT-Level Instructional Guideline

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

I. Introduction
   A. Anatomy and Physiology Review of the Female Reproductive System
      1. Uterus
      2. Cervix
      3. Ovaries
      4. Vagina
      5. Breasts
   B. Female Reproductive Cycle
   C. Cultural Values Affecting Pregnancy
   D. Special Considerations of Adolescent Pregnancy

II. Physiology
   A. Normal Anatomical, Physiological, and Psychological Changes in Pregnancy
      1. Reproductive system
      2. Respiratory system
      3. Cardiovascular system
      4. Musculoskeletal system
   B. Identify Normal Events of Pregnancy
   C. Conception and Fetal Development
      1. Ovulation
      2. Fertilization
      3. Implantation
      4. Embryonic stage
      5. Fetal stage
   D. Functions of the Placenta

III. General System Physiology, Assessment, and Management
   A. Premonitory Signs of Labor
      1. Lightening
      2. Braxton Hicks
      3. Cervical changes

4. Bloody show
5. Rupture membranes
6. Other

B. Stages of Labor and Delivery
1. First stage
2. Second stage
   a. Spontaneous birth
   b. Positional changes of the fetus
3. Third stage
   a. Placental separation
   b. Placental delivery

C. Antepartum and Intrapartal Assessment Findings
1. Airway, breathing, circulation
2. Initial assessment
3. SAMPLE history
4. Vital signs
5. Obstetrical history
6. Physical examination
   a. Fetal movement
   b. Inspect for crowning

D. Management of a Normal Delivery Obstetrical Patient
1. Treatment modalities
   a. Oxygen
   b. Non-pharmacological intervention – positioning

E. Postpartum Care
1. Fundal massage
2. Signs of hemorrhage

IV. Complications of Pregnancy
A. Abuse
B. Substance Abuse
C. Diabetes Mellitus
D. Bleeding: Pathophysiology, Assessment, Complications, and Management
1. Abortion
   a. Elective abortion
   b. Spontaneous abortion
2. Ectopic pregnancy

E. Placental Problems: Pathophysiology, Assessment, Complications, and Management
1. Abruption placenta
2. Placenta previa

F. Hypertensive Disorders: Pathophysiology, Assessment, Complications, and Management
1. Pregnancy-induced hypertension
2. Preeclampsia
3. Eclampsia

V. High-Risk Pregnancy: Pathophysiology, Assessment, Complications, and Management
   A. Precipitous Labor and Birth
   B. Post-Term Pregnancy
   C. Meconium Staining
   D. Multiple Gestation
   E. Intrauterine Fetal Death

VI. Complications of Labor: Pathophysiology, Assessment, Complications, and Management
   A. Premature Rupture of Membranes
   B. Preterm Labor

VII. Complications of Delivery: Pathophysiology, Assessment, Complications, and Management
   A. Cephalic Presentation
   B. Breech
   C. Nuchal Cord
   D. Prolapse of Cord

VIII. Postpartum Complications: Pathophysiology, Assessment, Complications, and Management
   A. Hemorrhage
      1. Early
      2. Late
   B. Increase Risk of Embolism

Special Patient Populations

Neonatal Care

EMT Education Standard

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

EMT-Level Instructional Guideline

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

I. Initial Care of the Neonate
   A. Physiologic Response to Birth
      1. Respiratory adaptations
      2. Cardiovascular adaptations
      3. Temperature regulation
   B. Routine care
      1. Support
      2. Dry
      3. Warm
      4. Position
      5. Airway
      6. Stimulation
   C. Assessment

Special Patient Populations
Pediatrics

EMT Education Standard

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

EMT-Level Instructional Guideline

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

I. Anatomy and Physiology
   - A. Pediatric Head versus Adult's
   - B. Head is Proportionally Larger to Body Size
   - C. Implications for Health Care Provider
     1. Increased incidence of blunt head trauma
     2. Excessive heat loss may occur from head
     3. Securing the airway may be difficult; to open the airway and obtain "sniffing" position may require a towel or roll under the shoulders
   - D. Examine Fontanelles in Infants
     1. Bulging fontanelle in an ill-appearing non-crying infant suggests increased intracranial pressure
     2. Sunken fontanelle in an ill-appearing infant suggests dehydration

II. Airway Compared to an Adult's
   - A. Smaller in Diameter and Shorter in Length
   - B. Jaw Smaller With Infant's Tongue Taking Up More Room in the Oropharynx
   - C. Infants are Nasal Breathers
   - D. Tracheal Cartilage is Softer and More Collapsible
   - E. Epiglottis of Infants and Toddlers Long, Floppy, Narrow and Extends at a 45-Degree Angle Into Airway
   - F. Implications for the Health Care Provider
     1. Essential to suction the nares of infants in respiratory distress
     2. Posterior displacement of the tongue may cause airway obstruction
     3. Smaller airways more easily obstructed by
        - a. Flexion or hyperextension
        - b. Particulate matter (including mucus)
        - c. Soft tissue swelling (injury, inflammation) can cause obstruction

III. Chest and Lungs Compared to an Adult's
   - A. Ribs More Cartilaginous and Pliable
   - B. Less Overlying Muscle and Fat to Protect Ribs and Vital Organs

C. Young Children Breathe Primarily With Their Diaphragms
D. Thin Chest Wall Easily Transmits Breath Sounds
E. Implications for the Health Care Provider
    1. Effective diaphragmatic excursion essential for adequate ventilation
    2. Rib fractures less common due to pliability; when present represent significant energy transmission accompanied by multi-system injury (e.g., pulmonary contusion)
    3. Lungs prone to pneumothorax from excessive pressures while bag-mask ventilating

IV. Abdominal Difference
A. Less-Developed Abdominal Muscles and Organs Situated More Anteriorly, Therefore Less Protection of Rib Cage
B. Liver and Spleen Proportionally Larger
C. Implications for the Health Care Provider
    1. Seemingly insignificant forces can cause serious internal injury
    2. Liver, spleen, and kidneys are more frequently injured
    3. Multiple organ injury common

V. Extremities Compared to Adult's
A. Bones Softer
B. Open Growth Plates Are Weaker Than Ligaments and Tendons, So Injury to Growth Plate Can Result in Length Discrepancies
C. Implications for the Health Care Provider

VI. Integumentary Differences
A. Larger Surface Area to Body Mass Ratio
B. Implications for the Health Care Provider
    1. Skin more easily, quickly, and deeply burned
    2. Larger surface can lead to large fluid and heat losses
    3. Hypothermia can complicate resuscitative efforts

VII. Respiratory System Compared to an Adult's
A. Higher Oxygen Demand per Kilogram of Body Weight (Twice That of an Adult's)
B. Smaller Lung Oxygen Reserves
C. Implications for the Healthcare Provider
    1. Higher oxygen demand with less reserve increases risk of hypoxia with apnea or ineffective bagging
    2. Err on using a larger bag for ventilating the pediatric patient (regardless of the size of the bag used for ventilation, use only enough force to make the chest rise slightly)

VIII. Nervous System and Spinal Column Compared to an Adult's
A. Continually
B. Brain Tissue and Vascular System More Fragile and Prone to Bleeding From Injury

C. Subarachnoid Space Is Relatively Smaller, With Less Cushioning Effect for Brain
D. Pediatric Brain Requires Nearly Twice the Cerebral Blood Flow As Does an Adult's
E. Brain and Spinal Cord Less Well Protected
F. Implications for the Health Care Provider
    1. The large cerebral blood flow requirement increases risk of hypoxia; hypoxia and hypotension in a child with a head injury can cause ongoing damage
    2. Head momentum may result in bruising and damage to the brain
    3. Spinal cord injuries less common
    4. Cervical spine injuries more commonly ligamentous injuries

IX. Metabolic Differences Compared to an Adult
A. Limited Glucose Stores
B. Newborns and Infants Less Than One Month Most Susceptible to Hypothermia
C. Implications for the Health Care Provider
    1. Keep the infant or child warm during treatment and transport
    2. Cover the head (not the face, though) to minimize heat loss
    3. Newborns should not be overwarmed, as this can worsen their neurologic outcomes

X. Growth and Development
A. Infancy
    1. Birth to two months
        a. Physical development
            i. control gazing at faces, turning their heads, and sucking
            ii. sleep accounts for up to 16 hours a day
            iii. infants have a relatively large surface area which predisposes them to hypothermia
        b. Cognitive development
            i. crying form of communication
            ii. infants cry for obvious reasons such as hunger and needing to be changed
            iii. when obvious reasons for crying have been addressed, persistent crying can be a sign of significant illness
        c. Implications for the health care provider
            i. persistent crying or irritability in a 0- to 2-month-old can be a symptom of serious illness
            ii. infants sleep a lot, however should arouse easily; inability to arouse a baby should be considered an emergency
            iii. head control is limited
    2. Two to six months
        a. Physical development
            i. voluntarily smile and increasing eye contact
            ii. uses both hands to examine objects
            iii. 70 percent of babies sleep through the night by six months
            iv. intentional rolling over begins
            v. begin to hold their heads up

b. Cognitive development
    i. increased awareness of surroundings
    ii. explore bodies
c. Implications for the health care provider
    i. persistent crying or irritability can be a symptom of serious illness
    ii. by six months, babies should make eye contact; lack of eye contact in a sick infant could be a sign of significant illness or depressed mental status or delayed development

3. Six to 12 months
    a. Physical development
        i. sit without support
        ii. develop a pincer grasp; everything goes to the mouth
        iii. begin to crawl
        iv. begin getting teeth and eating soft foods
    b. Cognitive development
        i. begin babbling and by 12 months learn their first word
        ii. develop "separation anxiety" from parents
    c. Implications for the health care provider
        i. persistent crying or irritability can be a symptom of serious illness
        ii. at-risk for foreign body aspiration and poisoning due to exploration of environment with their mouths
        iii. reduce separation anxiety by keeping the child and parent together during evaluation and involving the parent in the treatment if appropriate
        iv. crawling and walking increase exposure to physical dangers

B. Toddler Years
1. Twelve to 18 months
    a. Physical development – begin to walk and explore their environments
    b. Cognitive development
        i. imitate older children and parents
        ii. know major body parts
        iii. know four to six words
    c. Implications for the health care provider
        i. persistent crying or irritability can be a symptom of serious illness
        ii. children may not be able to grind up food before swallowing, due to lack of molars, increasing risk of food aspiration
        iii. increased mobility increases exposure to physical dangers and injury
        iv. distracting a child with a flashlight or toy may aid in physical exam

2. Eighteen to 24 months
    a. Physical development
        i. improved gait and balance
        ii. begin to run and climb
    b. Cognitive development
        i. begin to understand cause and effect
        ii. begin to label objects
        iii. ten to 15 words becomes 100 by 24 months
    c. Emotional development
        i. clinginess with parents
        ii. attachment to a special object, like a blanket
    d. Implications for the health care provider
        i. persistent crying or irritability can be a symptom of serious illness
        ii. allow a child to hold objects of importance to them (e.g., blanket)
        iii. children no longer require shoulder rolls to limit flexion of the neck when bag-valve-mask ventilating or intubating
        iv. painful procedures make lasting impressions

C. Preschool Years (2-5 Years)
1. Physical development
    a. Perfectly normal walking and running
    b. Begin throwing, catching, kicking
    c. Toilet training
2. Cognitive development
    a. Most rapid increase in language
    b. Magical thinking
    c. Rules tend to be absolute
    d. Irrational fears
3. Emotional development
    a. Learn acceptable behaviors
    b. Tantrums around control issues
    c. Modesty developing
4. Implications for the health care provider
    a. Rapid increase in language enhances ability to understand care explanations
    b. Respect modesty
    c. Foreign body airway obstruction risk continues to be high
    d. Appealing to their magical thinking may allow you to do more (e.g., this magic smoke will help you breathe better [nebulizer])

D. Middle Childhood Years (6-12 Years)
1. Physical development
    a. Loss of baby teeth; permanent teeth come in
2. Cognitive development
    a. Think logically
    b. School important

3. Emotional development
    a. Popularity and peer pressure important
    b. Children with chronic illness or disabilities very self-conscious
    c. Begin to understand that death is final
4. Implications for health care provider
    a. Provide simple explanations for illness and treatments
    b. Provide sense of control by giving choices if possible
    c. Respect patient's modesty and cover after the physical exam
    d. Asking about school will often allow patients to warm up to you faster

E. Adolescence (12-20 Years)
1. Physical development – puberty begins
2. Cognitive development
    a. Ability to reason
    b. Do not see possibilities as real things which could happen to them
    c. Develop morals
3. Emotional development
    a. Self-conscious about body image
    b. Begin to understand who they are and begin to be comfortable with that
    c. Relationships generally transition to those of the opposite sex
4. Implications for the health care provider
    a. Explain things clearly and honestly as you would to an adult
    b. Give choices when appropriate
    c. Respect modesty and cover after the physical exam
    d. Be honest about procedures which will cause discomfort
    e. Address concerns and fears about the lasting effects of their injuries (especially cosmetic) and if appropriate, reassure
    f. Adolescence time of hormonal surges, emotions, and peer pressure; increases risk for substance abuse, self-endangerment, pregnancy, and dangerous sexual practices

XI. Assessment

A. General Considerations
1. Many components of the initial evaluation can be done by careful observation without touching the patient
2. When appropriate, utilize the parent/guardian to help the infant or child be more comfortable with your exam and therapies
3. Communicating with scared, concerned parents and family is an important aspect of one's responsibilities at the scene of an ill infant or child
4. Assessment is an ongoing process continuing until care is transferred to the receiving facility

B. Assessment Process
1. Preparing for arrival
    a. Assembling age-appropriate equipment
    b. Reviewing age-appropriate vital signs and anticipated development

2. Scene survey
    a. Evaluate the scene for safety threats to patient and health care providers
    b. Evaluate the scene for clues related to the chief complaint
        i. ingestions or toxic exposures: pills, medicine bottles, chemicals, alcohol, drug paraphernalia, etc.
        ii. child abuse: injury must be consistent with history given and physical/developmental capabilities of the patient
        iii. note position and location in which patient is found
    c. Observe and note parents'/guardians'/caregivers' interactions with the child
        i. are they appropriately concerned, angry, or indifferent?
        ii. does the child seem comforted by them or scared by them?
3. Patient assessment
    a. Pediatric assessment triangle
        i. general
            a) Provides a 15- to 30-second assessment of the severity of the patient's illness or injury
            b) Use prior to addressing "the ABCs"
            c) Does not require touching the patient, just looking and listening
        ii. components
            a) appearance
                i) muscle tone
                ii) interactiveness
                iii) consolability
                iv) eye contact
                v) speech or cry
            b) work of breathing
                i) abnormal airway noise (i.e., wheeze, stridor, grunting)
                ii) abnormal positioning (i.e., tripoding)
                iii) retractions (i.e., chest wall, nasal flaring)
            c) Circulation to the skin
                i) pallor
                ii) mottling
                iii) cyanosis
        iii. possible physiologic states based upon the above three components
            a) respiratory distress or failure
            b) cardiovascular shock
            c) cardiopulmonary failure or arrest
            d) isolated head injury, ingestion, or other primary CNS abnormality
            e) stable patient

iv. initial triage and transport decision based on physiologic state
    a) urgent—begin rapid ABCs assessment and treatment; transport once treatment has begun
    b) stable patient—proceed with ABCs assessment followed by focused history and complete physical exam; begin transport starting potential therapies en route

4. Hands-on ABCs
    a. Airway
        i. open and remove if possible, secretions, blood, or foreign body(ies)
        ii. maintainable on its own, with help (jaw thrust, chin lift, oral or nasal airway), or unmaintainable (in need of advanced airway care)
    b. Breathing/oxygenation
        i. respiratory rate and effort
        ii. auscultation for wheezes, crackles, etc.
        iii. oxygen saturation
    c. Circulation
        i. heart rate
        ii. central and peripheral pulse quality: strong or weak
        iii. extremity skin temperature, assess capillary refill time, and active bleeding
        iv. blood pressure
    d. Disability
        i. determine level of consciousness
        ii. AVPU scale
        iii. assess pupils: dilated, constricted, reactive, or fixed
        iv. neurological motor deficit or moving all extremities equally
        v. pain assessment using standardized pain scale
    e. Exposure
        i. examine for additional injuries and rashes
        ii. promptly cover to prevent hypothermia
5. Additional assessment
    a. Focused history
        i. symptoms and duration
            a) fever
            b) activity level
            c) recent eating, drinking, and urine output history
            d) history of vomiting, diarrhea, or abdominal pain
            e) note any rashes
        ii. medications taking and medication allergies
        iii. past medical problems or chronic illnesses
        iv. key events leading to the injury or illness
    b. Detailed physical exam—“Head to Toe”
        i. head: bruising, swelling, quality of fontanelles, if present

ii. nose: drainage obstructing ability to breathe through nose
iii. ears: drainage suggestive of trauma or infection
iv. mouth: loose teeth, identifiable odors, bleeding
v. neck: abnormal bruising or swelling, inability to move neck if febrile
vi. chest and back: bruises, injuries, or rashes
vii. abdomen: distention, tenderness, seat belt abrasions or bruising
viii. extremities: deformities, swellings, or pain on movement

XII. Specific Pathophysiology, Assessment, and Management
A. Respiratory Distress
1. Introduction
a. Epidemiology
b. Anatomic and physiologic differences in children
2. Pathophysiology
a. Respiratory distress
b. Respiratory failure
c. Respiratory arrest
3. Assessment
a. History
b. Physical findings
4. Upper airway obstruction
a. Croup
b. Foreign body aspiration
c. Bacterial tracheitis
d. Epiglottitis
e. Tracheostomy dysfunction
5. Lower airway disease and reactive airway disease
a. Asthma
b. Bronchiolitis
c. Pneumonia
d. Foreign body lower airway obstruction
e. Pertussis
6. Management
a. Airway positioning (chin lift, jaw thrust)
b. Age and situation appropriate airway clearance measures (finger sweep, back blows, abdominal thrusts, suctioning)
c. Airway adjuncts (nasopharyngeal and oropharyngeal airways)
d. Oxygen
e. Inhaled medications (albuterol)
f. Assisted ventilation (bag mask)
B. Shock
1. Introduction
a. Anatomic differences
b. Physiologic differences

2. Pathophysiology
    a. Shock shock
    b. Decompensated shock
3. Assessment
    a. History
    b. Physical findings
4. Management

C. Neurology
1. Introduction
    a. Anatomic differences
    b. Physiologic differences
2. Pathophysiology
    a. Causes of altered mental status in children
    b. Causes of seizures
        i. febrile
        ii. afebrile
3. Assessment
    a. History
    b. Physical findings
4. Specific Conditions
    a. Meningitis
    b. Seizures
        i. febrile/afebrile
        ii. status epilepticus
    c. Altered mental status
    d. Closed head injury
        i. bleeding inside skull
        ii. fractures
5. Management
    a. Seizures
    b. Altered mental status
        i. assess for need to protect airway
        ii. assess and intervene for increased intracranial
6. Management

D. Gastrointestinal
1. Introduction – anatomic and physiologic differences in children
2. Pathophysiology
    a. Vomiting
    b. Diarrhea
3. Assessment
    a. History
    b. Physical findings
4. Vomiting and diarrhea

E. Toxicology
    1. Introduction
    2. Assessment
        a. History
        b. Physical findings
        c. Ingestion
        d. Inhalation
F. Sudden Infant Death Syndrome (SIDS)
    1. Introduction
        a. Definition of SIDS
        b. Risk factors
    2. Assessment
        a. Cardiopulmonary status
        b. Clinical signs of death
        c. Evaluation for signs of abuse
    3. Management
        a. Local EMS criteria for death in the field
        b. Notification of appropriate authorities
        c. Caregiver support
G. Pediatric Trauma

Special Patient Populations
Geriatrics

EMT Education Standard

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

EMT-Level Instructional Guideline

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

I. Cardiovascular System Anatomical and Physiological Changes, and Pathophysiology
   A. Cardiovascular Changes in the Elderly
      1. Degeneration of valves
      2. Degeneration of conduction system
      3. Vascular changes
      4. Muscular changes
      5. Stroke volume
      6. Cardiac output
      7. Dysrhythmias
   B. Myocardial Infarction
      1. Associated signs and symptoms
         a. Recognition of the types of chest pain that occur in the elderly
            i. Typical
            ii. atypical
         b. Dyspnea
         c. Epigastric and abdominal pain
         d. Nausea and vomiting
         e. Fatigue
         f. Dizziness, lightheaded, syncope
         g. Confusion
      2. Possible changes in physical assessment
         a. Changes in circulation
         b. Diaphoresis, pale, cyanotic mottled skin
         c. Adventitious or decrease breath sounds
         d. Increased peripheral edema
      3. Assessment tools
      4. Treatment
         a. Airway, ventilatory, and circulatory support
         b. Oxygen with adjuncts appropriate to patient condition
         c. Evaluation of patient treatment through reassessment

C. Heart Failure – A Condition Caused by Left and Right Ventricular Failure With Accompanying Pulmonary Edema
   1. Associated signs and symptoms
      a. Dyspnea – on exertion and paroxysmal nocturnal dyspnea
      b. Orthopnea
      c. Tachypnea
      d. Pulmonary edema
      e. Accessory muscle use to breath
      f. Chest Pain
      g. Anxiety
      h. Fatigue
   2. Possible changes in physical assessment
      a. Changes in circulation
      b. Diaphoresis and Cyanosis
      c. Adventitious breath sounds to include crackles, wheezing, and rales
      d. Tachycardia
      e. Hypertension early and hypotension as a late sign
   3. Assessment tools – blood pressures
   4. Treatment
      a. Airway, ventilatory, and circulatory support
      b. Oxygen with adjuncts appropriate to patient condition

II. Respiratory System Anatomical and Physiological Changes, and Pathophysiology
A. Respiratory Changes in the Elderly
   1. Loss of elastic recoil in the chest wall resulting in air trapping and increase in lung capacity and residual volume
   2. Loss of alveoli
   3. Reduction in oxygen and carbon dioxide exchange
   4. Inability to increase rate of respiratory effort
   5. Decreased cough reflex
   6. Decreased ability of cilia to move mucus upward
B. Pneumonia – Infection of the Lung From Bacterial Viral or Fungal Causes
   1. Evaluation of pathophysiology through history and possible risk factors
      a. Institutionalized
      b. Chronic disease processes
      c. Immune system compromise
      d. Chronic Obstructive Pulmonary Disease
      e. Cancer
      f. Inhaled toxins
      g. Aspiration
   2. Associated signs and symptoms
      a. Exertional dyspnea
      b. Productive cough
      c. Chest discomfort and pain
      d. Wheezing
      e. Headache

f. Nausea and vomiting
g. Musculoskeletal pain
h. Weight loss
i. Confusion

3. Possible changes in physical assessment
   a. Changes in circulation
   b. Cyanosis and pallor, dry skin, possible fever
   c. Increased skin turgor, pale, dry mucosa, and furrowed tongue
   d. Tachycardia
   e. Diminished breath sounds with adventitious noises of wheezing, rales, or rhonchi; percussion will produce a dull sound; increased vocal
   f. Hypotension
4. Assessment
   a. Wheezing, rales, and rhonchi
   b. Temperature: oral or core
   c. Orthostatic pressures
   d. Pulse oximetry
5. Treatment
   a. Airway, ventilatory, and circulatory support
   b. Oxygen with appropriate adjuncts
   c. Supportive measures
   d. Evaluation of patient treatment through reassessment

C. Pulmonary Embolism – Sudden Blockage of the Pulmonary Artery by a Venous Clot

1. Associated signs and symptoms
   a. Sudden onset of dyspnea
   b. Shoulder/back/chest pain
   c. Syncope
   d. Anxiety/apprehension
   e. Fever
   f. Leg pain/redness/unilateral pedal edema
   g. Fatigue
   h. Cardiac arrest
2. Possible changes in physical assessment
   a. Changes in circulation
   b. Tachycardia
   c. Adventitious noises such as wheezing, rales or decrease breath sounds
   d. Decreased pulse oximetry reading of 70 percent or lower
   e. Hypotension
3. Assessment tools
   a. Blood pressure
   b. Pulse oximetry
4. Treatment
   a. Airway, ventilatory, and circulatory support

b. Oxygen with appropriate adjunct; events may necessitate aggressive management
c. Respiratory and cardiac arrest management according to current ACLS standards or area protocol
d. Evaluation of patient treatment through reassessment

III. Neurovascular System Anatomical and Physiological Changes, and Pathophysiology
A. Neurovascular Changes in the Elderly
1. Atrophy of the brain tissue
a. Cognitive and short-term memory effects
b. Delayed verbal response
2. Deterioration of the nervous system function in controlling
a. Rate and depth of breathing
b. Heart rate
c. Blood pressure
d. Hunger and thirst
e. Temperature
f. Sensory perception – including audio, visual, olfactory, touch, and pain
3. Neuropathy
B. Dementia – A Chronic, Generally Irreversible Condition That Causes a Progressive Loss of Cognitive Abilities, Psychomotor Skills, and Social Skills
1. Demographics
2. Evaluation of pathophysiology through history, and risk factors and current medications
a. Cerebrovascular accidents
b. Alzheimer's disease
c. Various forms of encephalitis
d. Alcohol
e. Work history with metals or organic or airborne toxins
3. Known reversible causes of dementia
a. Drug overdose
b. Emotional disorders
c. Metabolic and endocrine disorders
d. Eye and ear problems
e. Tumors
f. Trauma
g. Infections
h. Parkinson's disease
i. Huntington's chorea
4. Associated signs and symptoms
a. Progressive loss of cognitive function; short- and long-term memory problems, decreased attention span
b. Inability to perform daily routines with decreased ability to communicate and confusion over environment
c. Mood often angry

5. Problems associated with management of patient with dementia
    a. Poor historian; impaired judgment
    b. Inability to vocalize areas of pain and current symptoms
    c. Unable to follow commands
    d. Anxiety over movement out of home or current establishment
    e. Anxiety and fear of treatment of current medical problems

C. Delirium – A Sudden Change in Behavior, Consciousness, or Cognitive Processes Generally Due to a Reversible Physical Ailment
1. Mortality rates
2. Evaluation of pathophysiology through history, possible risk factors, and current medications
    a. Intoxication or withdrawal from alcohol
    b. Withdrawal from sedatives
    c. Medical conditions as urinary tract infections/ Bowel obstructions
    d. dehydration, cardiovascular disease, febrile episodes may increase risk
    e. Hyper/hypoglycemia
    f. Psychiatric disorders (i.e., depression)
    g. Malnutrition/vitamin deficiencies
    h. Environmental emergencies
3. Associated signs and symptoms
    a. Onset of minutes, hours, days
    b. Disorganized thoughts: inattention, memory loss, disorientation
    c. Hallucinations
    d. Delusions
    e. Reduced level of consciousness
4. Possible changes in physical assessment
    a. Changes in circulation
    b. Changes in response of pupils
    c. Changes in response to motor tests
    d. Adventitious breath sounds
5. Assessment tools
    a. Blood pressures
    b. Auscultation of breath sounds to detect adventitious noises
6. Treatment
    a. Airway, ventilatory, and circulatory support
    b. Oxygen with adjuncts appropriate to patient condition
    c. Venous access

IV. Gastrointestinal System Anatomical and Physiological Changes, and Pathophysiology

A. Gastrointestinal (GI) Changes in the Elderly
1. Dental problems
2. Decrease in saliva
3. Poor muscle tone of smooth muscle sphincter between esophagus and stomach can cause regurgitation leading to heartburn, and acid reflux
4. Decrease in hydrochloric acid in the stomach
5. Alterations in absorption of nutrients

6. Slowing peristalsis causing constipation
7. Rectal sphincter may become weak resulting in fecal incontinence
8. Liver shrinks
9. Blood flow to the liver declines
10. Decrease metabolism in the liver

B. Gastrointestinal Bleeding Caused by Disease Processes, Inflammation, Infection and Obstruction of the Upper and Lower Gastrointestinal Tract
1. Associated signs and symptoms
   a. Hematamesis
   b. Hemetemesis
   c. Melena
   d. Dyspepsia
   e. Hepatomegaly
   f. Jaundice
   g. Constipation, diarrhea
   h. Agitation, inability to find a comfortable position
   i. Dizziness
2. Possible changes in physical assessment
   a. Changes in circulation
   b. Pale or yellow, thin skin, frail musculoskeletal system
   c. Peripheral, sacral, and periorbital edema
   d. Hypertension
   e. Fever
   f. Tachycardia
   g. Dyspnea
3. Assessment tools – blood pressure
4. Treatment:
   a. Airway, ventilatory, and circulatory support
   b. Oxygen with adjuncts appropriate to patient condition
5. Assessment tools
   a. Blood pressures, lying, sitting, and standing noting any change of 10 mm/Hg or more lower as the patient moves to an upright position
   b. Pulses, lying, sitting, and standing noting any change of 10 beats per minute more higher as the patient moves to an upright position
   c. Auscultation of breath sounds to detect adventitious noises, or foreign bodies
6. Treatment:
   a. Airway, ventilatory and circulatory support
   b. Oxygen with adjuncts appropriate to patient condition

V. Genitourinary System Anatomical and Physiological Changes, and Pathophysiology

A. Genitourinary Changes in the Elderly
1. Reduction in renal function
2. 50 percent reduction in renal blood flow
3. Tubule degeneration
4. Decreased bladder capacity

5. Decline in sphincter muscle control
6. Decline in voiding senses
7. Increase in nocturnal voiding
8. In males benign prostatic hypertrophy

VI. Endocrine System Anatomical and Physiological Changes, and Pathophysiology

A. Endocrine Changes in the Elderly
1. Decreased metabolism of thyroxine
2. Decreased conversion of thyroxine to triiodothyronine
3. Reduction in pancreatic beta cell secretion causing hyperglycemia
4. Reduction of the hormones secreted by the hypothalamus and pituitary gland
5. Increase in secretion of antidiuretic hormone and atrial natriuretic hormone causing fluid imbalance
6. Increase in levels of norepinephrine

B. Hyperosmolar Hyperglycemic (Nonketotic Coma) Is a Diabetic Complication of Type 2 (Formerly NIDDM of Type II) in the Elderly; Unlike DKA the Resulting High Blood Glucose Levels Do Not Cause Ketosis, but Rather Lead to Osmotic Diuresis, and Shift of Fluid to the Intravascular Space, Resulting in Dehydration
1. Associated signs and symptoms
   a. Hyperglycemia
   b. Polydipsia
   c. Dizziness
   d. Confusion
   e. Altered mental status
   f. Seizures
2. Possible changes in physical assessment
   a. Changes in circulation
   b. Warm, flushed skin, poor skin turgor; pale, dry, oral mucosa, furrowed tongue
   c. Hypotension and shock
   d. Tachycardia
   e. Blood glucose levels greater than 500 mg/dL
3. Assessment tools
   a. Blood pressures
   b. Distal pulses
   c. Auscultation of breath sounds to detect adventitious noises
   d. Temperature
4. Treatment
   a. Airway, ventilatory, and circulatory support
   b. Oxygen with adjuncts appropriate to patient condition

VII. Musculoskeletal System Anatomical and Physiological Changes, and Pathophsysiology

A. Musculoskeletal Changes in the Elderly
1. Atrophy of muscles and muscle wasting
2. Degenerative changes and loss of bone
3. Loss of strength

4. Degenerative changes in joints
5. Loss of elasticity in ligaments and tendons
6. Thinning of cartilage and thickening of synovial fluid

B. Osteoporosis Is a Bone Disease That Decreases Bone Density

VIII. Toxicological Emergencies

A. Pathophysiological Changes That Cause the Elderly to Be Susceptible to Toxicity
1. Decreased kidney function
2. Altered gastrointestinal absorption
3. Decrease vascular flow in the liver altering metabolism and excretion

B. Non-Compliance of Medication Can Occur From Financial Inability, a Motor Inability to Open Caps, Impaired Cognitive, Vision and Hearing Ability; Medics Should Check Prescription Dates and Number of Pills Available to Access Compliance of Medication Use

C. Polypharmacy is the Use of Multiple Medications, Often Prescribed by Different Doctors That Can Cause Adverse Reactions in the Patient

D. Adverse Reactions Occur When a Drug or Drugs Taken Together Change the Pharmacokinetics or Pharmacodynamics in the Body

IX. Sensory Changes in the Elderly

A. Vision
1. Decreased visual acuity – inability to accommodate
2. Inability to differentiate colors
3. Decreased night vision
4. Decreased tear production
5. Development of cataracts
6. Disease processes
a. Glaucoma
b. Macular degeneration
c. Retinal detachment

B. Hearing
1. Presbycusis
2. Inability to hear high frequency sounds
3. Use of hearing aids

C. Pain Perception
1. Alteration of pain perception
2. Inability to differentiate hot from cold

Special Patient Populations

Patients With Special Challenges

EMT Education Standard

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

EMT-Level Instructional Guideline

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

I. Abuse and Neglect
- A. Child Abuse
  - 1. Types of abuse
    - a. Neglect
    - b. Physical abuse
    - c. Sexual abuse
    - d. Emotional abuse
  - 2. Assessment
    - a. History or scene findings to concern for abuse or neglect
    - b. Caregiver's behavior
    - c. Physical findings
  - 3. Management
    - a. Reporting
    - b. Safely transporting
    - c. Role of child/adult protective services
  - 4. Legal aspects
  - 5. Documentation
- B. Elder Abuse
  - 1. Types of abuse
    - a. Neglect
    - b. Physical abuse
    - c. Sexual abuse
    - d. Emotional abuse
    - e. Financial abuse
  - 2. Epidemiology
  - 3. Assessment
  - 4. Management
  - 5. Legal aspects
  - 6. Documentation

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

III. Bariatric Patients
   A. Increased Risk for
      1. Diabetes
      2. Hypertension
      3. Heart disease
      4. stroke
   B. Patient Handling Issues to
      1. Prevent back injuries
      2. Position the patient to breathe

IV. Technology Assisted/Dependent
   A. Ventilation Devices
   B. Apnea Monitoring/Pulse Oximetry
   C. Long-Term Vascular Access Devices
   D. Dialysis Shunts
   E. Nutritional Support (i.e. gastric tubes)
   F. Colostomy or Ileostomy

V. Hospice Care and Terminally Ill
   A. What is Hospice?
      1. Comfort care versus curative care
      2. Terminally ill as verified by physician
      3. Typically cancer, heart failure, Alzheimer's disease, AIDS
   B. EMS Intervention
   C. DNR (Do Not Resuscitate) Orders

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

VII. Sensory Deficits
- A. Sight
  - 1. Service dogs
  - 2. Allow patient to take your arm
  - 3. Other
- B. Hearing Impaired
  - 1. Hearing aid issues
  - 2. Communication
    - a. Face patient (so he can lip read)
    - b. Lighted area
    - c. Communicate by writing
    - d. Obtain sign language interpreter

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

IX. Patient With Developmental Disability
- A. Respect as With Any Other Patient
- B. Family or Friends May Supply Additional Information
- C. Take Special Care to Provide Explanations

EMS Operations

Principles of Safely Operating a Ground Ambulance

EMT Education Standard

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

EMT-Level Instructional Guideline

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

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

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

I. Risks and Responsibilities of Emergency Response
   A. Safety Issues During Transport
      1. All personnel and others riding in or on apparatus are properly seated and secured with safety belts.
      2. All patients are properly secured and all stretcher straps are appropriately in place and tightened.
      3. All equipment is appropriately secured
         a. Cab areas
         b. Rear of ambulances
         c. Compartments
      4. Consideration of use of lights and sirens
         a. Risk/benefit analysis
            i. status of patient interventions
            ii. patient condition
         b. Audible warning devices
            i. asking for right of way of others
            ii. not to be used to clear traffic
      5. Transport with due regard
      6. High-risk situations
         a. Intersections
         b. Highway access
         c. Speeding

d. Driver Distractions
    i. mobile computer
    ii. global Positioning Systems
    iii. using mobile radio
    iv. operating visual and audible devices
    v. vehicle stereo
    vi. wireless devices
    vii. eating/drinking
e. Inclement weather
f. Aggressive drivers
g. Unpaved roadways (see Federal Highway Administration definition)
h. Driving alone
i. Fatigue

EMS Operations

Incident Management

EMT Education Standard

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

EMT-Level Instructional Guideline

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

I. Establish and Work Within the Incident Management System
   A. Entry-Level Students Need to Be Certified in
      1. ICS-100: Introduction to ICS, or equivalent
      2. FEMA IS-700: NIMS, An Introduction
   B. This Can Be Done as a Co requisite or Prerequisite or as Part of the Entry-Level Course

EMS Operations

Multiple Casualty Incidents

EMT Education Standard

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

EMT-Level Instructional Guideline

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

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

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

I. Multiple Casualty Incidents (MCI) -- An Event That Places a Great Demand on Resources, Be It Equipment or Personnel

II. Triage
- A. Performing
  - 1. Primary versus secondary
    - a. Primary triage used on scene to rapidly categorize patient's condition
      - i. document location of patient and transport needs
      - ii. triage tape or labels used
      - iii. focus on speed to sort patients quickly
    - b. Secondary triage used at treatment area
      - i. re-triage of patients
      - ii. paper tags usually used
      - iii. not always necessary
  - 2. Techniques of Triage
    - a. Center for Disease Control (CDC) Guidelines
    - b. START
    - c. Other
- B. Re-Triage
- C. Destination Decisions
  - 1. Patient distribution
  - 2. Hospital surge capacity

3. Specialty patient needs (burn, pediatric, etc.)
4. Ongoing coordination and communication

D. Post-Traumatic and Cumulative Stress
1. Should be part of post-incident SOP
2. Access to defusing during the MCI
3. Roles of debriefing for an MCI
1. Access to debriefing

EMS Operations
Air Medical

EMT Education Standard

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

EMT-Level Instructional Guideline

The intent of this section is to give an overview of operating safely in and around a landing zone during air medical operations and transport.

Information related to the clinical management of the patients during air medical operations is found in the clinical sections of the National EMS Education Standards and Instructional Guidelines for each personnel level.

I. Safe Air Medical Operations
   A. Types
      1. Rotorcraft
      2. Fixed wing
   B. Advantages
      1. Specialized care – skills, supplies, equipment
      2. Rapid transport
      3. Access to remote areas
      4. Helicopter hospital helipads
   C. Disadvantages
      1. Weather/environmental
      2. Altitude limitations
      3. Airspeed limitations
      4. Aircraft cabin size
      5. Terrain
      6. Cost
   D. Patient Transfer
      1. Interacting with flight personnel
      2. Patient preparation
      3. Scene safety
         a. Securing loose objects
         b. Approaching the aircraft
         c. Landing zone
   E. Landing Zone Selection and Preparation
   F. Approaching the Aircraft
   G. Communication Issues

II. Criteria for Utilizing Air Medical Response
- A. Indications for Patient Transport
  - 1. Medical
  - 2. Trauma
  - 3. Search and rescue
- B. Activation
  - 1. Local guidelines
  - 2. State guidelines
    - a. State statutes
    - b. Administrative rules
    - c. City/county/district ordinance standards

EMS Operations

Vehicle Extrication

EMT Education Standard

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

EMT-Level Instructional Guideline

The intent of this section is to give an overview of vehicle extrication to ensure EMS personnel and patient safety during extrication operations. This does not prepare the entry-level student to become a vehicle extrication expert or technician.

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

I. Safe Vehicle Extrication
- A. Role of EMS in Vehicle Extrication
  - 1. Provide patient care
  - 2. Perform simple extrication
- B. Personal Safety
  - 1. First priority for all EMS personnel
  - 2. Appropriate personal protective equipment for conditions
  - 3. Scene size-up
- C. Patient Safety
  - 1. Keep them informed of your actions
  - 2. Protect from further harm
- D. Situational Safety
  - 1. Control traffic flow
    - a. Proper positioning of emergency vehicles
      - i. upwind/uphill
      - ii. protect scene
    - b. Use of lights and other warning devices
    - c. Setting up protective barrier
    - d. Designate a traffic control person
  - 2. 360-degree assessment
    - a. Downed electrical lines
    - b. Leaking fuels or fluids
    - c. Smoke or fire
    - d. Broken glass
    - e. Trapped or ejected patients
    - f. Mechanism of injury

3. Vehicle stabilization
    a. Put vehicle in “park” or in gear
    b. Set parking brake
    c. Turn off vehicle ignition
    d. Cribbing/Chocking
    e. Move seats back and roll down windows
    f. Disconnect battery or power source
    g. Identify and avoid hazardous vehicle safety components
        i. seat belt pretensioners
        ii. undeployed air bags
        iii. other
4. Unique hazards
    a. Alternative-fuel vehicles
    b. Undeployed vehicle safety devices
    c. HAZMAT
5. Evaluate the need for additional resources
    a. Extrication equipment
    b. Fire suppression
    c. Law enforcement
    d. HAZMAT
    e. Utility companies
    f. Air medical
    g. Others
6. Extrication considerations
    a. Disentanglement of vehicle from patient
    b. Multi-step process
    c. Rescuer-intensive
    d. Equipment-intensive
    e. Time-intensive
    f. Access to patient
        i. simple
            a) try to open doors
            b) ask patient to unlock doors
            c) ask patient to lower windows
        ii. complex
        iii. tools
            a) hand
            b) pneumatic
            c) hydraulic
            d) other

E. Determine Number of Patients (implement local multiple casualty incident protocols if necessary)

II. Use of Simple Hand Tools
A. Hammer
B. Center Punch
C. Pry Bar

D. Hack Saw
E. Come-Along

III. Special Considerations for Patient Care
A. Removing Patient
1. Maintain manual cervical spine stabilization
2. Complete primary assessment
3. Provide critical interventions
B. Assist With Rapid Extrication
C. Move Patient, Not Device
D. Use Sufficient Personnel
E. Use Path of Least Resistance

EMS Operations

Hazardous Materials Awareness

EMT Education Standard

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

EMT-Level Instructional Guideline

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

I. Risks and Responsibilities of Operating in a Cold Zone at a Hazardous Material or Other Special Incident
   - A. Entry-Level Students Need to Be Certified in: Hazardous Waste Operations and Emergency Response (HAZWOPER) standard, 29 CFR 1910.120 (q)(6)(i) -First Responder Awareness Level
   - B. This Can Be Done as a Co requisite or Prerequisite or as Part of the Entry-Level Course

EMS Operations
Mass Casualty Incidents Due to Terrorism and Disaster

EMT Education Standard

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

EMT-Level Instructional Guideline

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

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

I. Risks and Responsibilities of Operating on the Scene of a Natural or Man-Made Disaster
   A. Role of EMS
      1. Personal safety
      2. Provide patient care
      3. Initiate/operate in an incident command system (ICS)
      4. Assist with operations
   B. Safety
      1. Personal
         a. First priority for all EMS personnel
         b. Appropriate personnel protective equipment for conditions
         c. Scene size-up
         d. Time, distance, and shielding for self-protection
         e. Emergency responders are targets
         f. Dangers of the secondary attack
      2. Patient
         a. Keep them informed of your actions
         b. Protect from further harm
         c. Signs and symptoms of biological, nuclear, incendiary, chemical and explosive (B-NICE) substances
         d. Concept of "greater good" as it relates to any delay
         e. Treating terrorists/criminals

3. 360-degree assessment and scene size-up
    a. Outward signs and characteristics of terrorist incidents
    b. Outward signs of a weapons of mass destruction (WMD) incident
    c. Outward signs and protective actions of biological, nuclear, incendiary, chemical, and explosive (B-NICE) weapons
4. Determine number of patients (implement local multiple-casualty incident (MCI) protocols as necessary)
5. Evaluate need for additional resources
6. EMS operations during terrorist, weapons of mass destruction, disaster events
    a. All hazards safety approach
    b. Initially distance from scene and approach when safe
    c. Ongoing scene assessment for potential secondary events
    d. Communicate with law enforcement at the scene of an armed attack
    e. Initiate or expand incident command system as needed
    f. Perimeter use to protect rescuers and public from injury
    g. Escape plan and a mobilization point at a terrorist incident
7. Care of emergency responders on scene
    a. Safe use of an auto injector for self and peers
    b. Safe disposal of auto injector devices after activation

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