

## **Intro to Refresher Program**

### **2001 EMT-Paramedic: National Standard Curriculum Refresher Course**

This is the *2001 EMT-Paramedic: National Standard Curriculum Refresher Course*.

This course is intended for the EMS community to use to refresh their current Paramedic providers who have been educated to the 1998 EMT- Intermediate level. This course is not intended to transition current 1985 Paramedics to the revised 1998 level. The course was developed by the National Association of EMS Educators (NAEMSE).

# 2001 EMT-Paramedic: NSC Refresher Curriculum



## Instructor Course Guide



U.S. Department  
of Transportation

**National Highway  
Traffic Safety  
Administration**



U.S. Department of Health and Human Services

**HRSA**

Health Resources and Services Administration  
Maternal and Child Health Bureau

# Table of Contents

Introduction	3
History and Development Philosophy	3
Course Overview	5
NREMT Practice Analysis Task Items	5
Objectives and Declarative Material	5
Time Requirements	6
Course Planning Considerations	6
Needs Assessment	6
Course Design	7
Methods of Delivery	7
Instructor Attributes	7
Instructional Approach	8
Distributed Learning	8
Evaluating the Participants	9
Cognitive Evaluation	9
Psychomotor Evaluation	9
Remediation	10
Program Evaluation	10
Acknowledgments	11
Module I: Airway / Ventilation	I
Module II: Cardiovascular	II
Module III: Medical	III
Module IV: Trauma	IV
Module V: Pediatrics	V
Module VI: Other Recommended Content Areas	VI
Appendixes	
Appendix A – 1999 NREMT Practice Analysis Extract	
Appendix B – Practice Scenario and Scenario Template	
Appendix C – Practical Evaluation Skill Sheets	

## INTRODUCTION

### HISTORY AND DEVELOPMENT PHILOSOPHY

As part of the revision project for the EMT-Intermediate and EMT-Paramedic: National Standard Curricula (NSC), the contractor was directed to develop the *EMT-Paramedic and EMT-Intermediate Continuing Education, National Guidelines*. The guidelines document, developed as a substitute for traditional refresher courses, gives the reader an overview of competency assurance mechanisms to promote the delivery of medically appropriate patient care. The guidelines document defined refresher programs as follows:

Refresher programs are a review of the original program in a condensed number of hours. While ideal for the purpose of remediation, they are not intended to expand the cognitive or psychomotor ability above the entry level. Therefore, refresher courses should not be considered a means of continued expansion of cognitive information and introduction of new psychomotor skills. They are not intended to deliver relevant contemporary information to practitioners who are currently active in the field.

Although the guidelines document is widely used by the EMS community, the definition for refresher programs caused the EMS community to ask that refresher courses be developed. A contract to develop the refresher courses went to the National Association of EMS Educators (NAEMSE) and they convened a task force of EMS stakeholders inclusive of regulators, physicians, association representatives, providers, and educators.

Some challenges undertaken by the task force were:

1. The development of a refresher program based on scientific data.
2. A program that could be delivered in different formats.
3. A program flexible enough to meet the specific needs of different systems while maintaining the intent of a refresher program.
4. The need to incorporate relevant contemporary material.

The task force used EMS provider practice data, an EMS literature review, expert opinion, and a final EMS community review to develop the refresher programs. Previous versions of EMS refresher programs have been based on a perceived need and not on scientific evidence. With this in mind, the Refresher Development Task Force relied heavily on the findings of the 1999 *NREMT Practice Analysis* and the following documents:

- *The EMS Agenda for the Future*
- *The EMS Education Agenda for the Future, A Systems Approach*
- *The National EMS Education and Practice Blueprint*
- *EMT-Paramedic and EMT-Intermediate Continuing Education, National Guidelines*
- *1999 EMT-Intermediate National Standard Curriculum*

Each of the above documents was created as individual projects, but they are designed to work as a systems approach to EMS and integrate with one another. Contact the NHTSA EMS Division to obtain copies of these resources.

In 1994, the National Registry of Emergency Medical Technicians (NREMT) performed the first nationally conducted practice analysis of EMS. The information obtained in the first analysis was used in the development of the 1998 EMT-Paramedic and 1999 EMT-Intermediate: NSC. In 1999, the NREMT conducted its second practice analysis.

The *1999 NREMT Practice Analysis* is a scientific, randomized national sampling of practicing EMT-Paramedic and EMT-Intermediates. The EMT's participating in the practice analysis provided data on 123 various patient assessments focusing on patient care and operational tasks that make up the day-to-day functions of the providers. Each provider indicated the frequency they performed each task and the potential for harm they experienced accomplishing each task. A Practice Analysis Committee reviewed the data, validated the responses, and published the data in a peer reviewed medical journal. The NREMT Practice Analysis Committee used this data to develop a plan that grouped the identified tasks into the following six content areas:

- Airway and Breathing
- Cardiology
- Medical
- Trauma
- Pediatrics/Obstetrics
- Operations

The specific tasks from the practice analysis are listed in appendix A. The NREMT supplied the data from their practice analysis to the EMT-Paramedic refresher development task force. This information was used to help determine specific content for the refresher course.

The refresher task force used the NREMT data to identify tasks that are infrequent and may cause potential harm to the patient if delayed, performed improperly, or omitted when providing care. The panel decided to “refresh” these tasks since patient outcome is jeopardized if the task is not correctly performed. An example of this would be “*Provide care to an infant or child with cardiac arrest.*” The practice analysis categorizes this task as number 113 of 123 for frequency, but lists it as the number one task for potential for harm. The panel agreed and decided to include this task as a mandatory part of the refresher program.

Likewise, a task such as “*Provide care to a patient with a painful, swollen, deformed extremity*” is listed as task number 98 in frequency and number 100 as potential for harm. This task is not included as a mandatory part of the refresher program. Other tasks that are performed frequently and lack potential for harm are not included as a mandatory part of this refresher program. Again, the refresher course only targets infrequently performed tasks with a high potential for harm.

Upon further review of the practice analysis, the task force identified a few frequently performed tasks that have a very high potential for harm. The task force decided to also include all tasks with a high potential for harm, regardless of their frequency of performance.

Another tool used in the development of this refresher program was an EMS literature review. The literature review found issues not identified by the data from the *NREMT Practice Analysis*. The task force also sought expert opinion and feedback from the EMS community to identify additional course content.

## **COURSE OVERVIEW**

Traditional refresher programs refresh material already known by the students. The intent of these programs is to maintain a student's competence in knowledge and skill performance. This refresher program embraces the same concept, but it also encourages the inclusion of new and expanded information. New and expanded information may be added to the course but not at the expense of content that is core material for the program. This course is not designed to be continuing education for the participants. If a system wishes to incorporate additional information or a new intervention that requires a substantial amount of time to teach, the information must be offered in addition to the content of the refresher program. Moreover, this course is not a transition or bridge course for current EMT-Paramedics to become certified at the revised 1998 EMT-Paramedic level.

The participant make-up in a refresher program may challenge the instructional staff. Participants who attend a refresher program may do so for a variety of reasons. Some students may not have practiced for a period of time and are attending to gain back their level of competence prior to practicing again. Others may attend to remediate or gain refresher or continuing education hours. Knowledge of the participant make-up will help the instructors meet the participant's needs. A thorough knowledge of the re-credentialing requirements and approval process is a must for any organization sponsoring a refresher program.

### **NREMT PRACTICE ANALYSIS TASK ITEMS**

The *NREMT Practice Analysis* task items are listed at the beginning of each module. These tasks are included based upon their performance frequency and potential for harm.

### **OBJECTIVES and DECLARATIVE MATERIAL**

The objectives and declarative material are extracted from the 1998 EMT-Paramedic: NSC and they support the identified practice analysis tasks. The objectives and declarative material are renumbered for formatting purposes; however, the original objective number from the NSC is found at the end of each objective. The declarative material provides guidance for programs to use to establish their own individual lesson plans.

The objectives in modules 1-5 are mandatory objectives and must be included in every refresher program. The objectives for the operational section should be considered recommended content for the refresher course. Any other objectives and declarative information has not been included and should be developed by the sponsoring agency.

### **TIME REQUIREMENTS**

The length of this refresher program will vary according to a number of factors. Some of these factors are as follows:

- The student's basic academic skills competence
- The student's EMS knowledge and skills
- The faculty to student ratio
- The student's motivation
- The student's prior emergency/health care experience
- The student's prior academic achievements
- The clinical and academic resources available
- The quantity of patient contacts

The recommended time to instruct the mandatory objectives for the refresher program is 40 to 80 hours. Training institutes will need to adjust these times based on their individual needs. The agencies responsible for program oversight are cautioned against using these hours as a measure of program quality. Competence of the participants, not adherence to arbitrary time frames, is the true measurement of program quality.

## **COURSE PLANNING CONSIDERATIONS**

### **NEEDS ASSESSMENT**

The first step for the needs assessment is the performance of a comprehensive analysis of the factors that influence the local pre-hospital emergency care delivery system. Some factors included in this analysis are:

- Recertification requirements (local, state, national, professional).
- System structure.
- Call characteristics (i.e., volume, type).
- Community demographics.
- Community hazard assessment.

The second step of the needs assessment is an analysis of the education needs of the course participants. This assessment may include the following:

- Pre-testing
- Surveys
- Observations

- Expert Judgments
- Data Analysis

The information collected during the assessment process may be used as a guide to select specific material for the classroom. The assessment results can determine the course format, course schedule, and course methods. The selected material may be subjected to national, State, and local standards.

## **COURSE DESIGN**

The following steps will assist with the design and implementation of the course design.

### **Determine regulatory requirements for course conduct:**

The refresher course will be approved or accredited by the appropriate local or state agency. A part of this approval process will be the length of the course, the course content, and the faculty requirements or restrictions.

### **Develop schedule:**

The course is designed to allow programs to present the material in a variety of formats. The program may be delivered in class sessions that might include 8 hour consecutive days or may be taught in a shorter sessions extended over a period of months.

### **Determine class size:**

The course emphasizes the evaluation of participant skills. Class size should be manageable and allow students an opportunity to ask questions and receive answers or assistance from the instructor.

Since the instructor must observe and evaluate student performance, it is essential that the group's size not be too large when evaluating practical skills. Consider segmenting the class into smaller groups, such as 6:1 (students to instructor) when doing the practical skills session.

## **METHODS of DELIVERY**

### **INSTRUCTOR ATTRIBUTES**

Instructing a refresher program for practicing EMT-Paramedics is a challenge. We often hear that refresher programs lack challenge, cover material already well known, and are not deemed as useful for the participants. Faculty members must possess expertise in both the content area they instruct and in multiple delivery styles. Instructors must be proficient in performing the skills that they are instructing. Knowing your student's abilities and the local EMS system's expectations is essential for a successful program.

Instructional staff must be appropriately credentialed according to local or state requirements. The course medical director must be available throughout the program

and be aware of the course design and evaluation instruments being used. The course medical director may be utilized for medical expertise.

## **INSTRUCTIONAL APPROACH**

Given the repetitive nature of refresher education, it is easy for participants to become bored and lack enthusiasm about the program. The overuse of lecturing is ineffective as the sole method of learning. To improve the quality of the educational experience for instructors and participants, creative and innovative instructional activities are strongly recommended. Consider using some of the following:

### **Case Presentation**

Case presentation and discussion helps participants apply and understand the content by relating to their field experiences. The instructional staff can generate cases by using actual calls. Instructors should develop case studies to highlight key points of their presentations and the area of content being delivered. The most successful case presentations are those placing the participant(s) in a decision-making role allowing them to see the consequences of their decisions. Case presentations can be used in any format, such as, large classes, small groups, and individual instruction. Several examples and templates for case construction are in Appendix B.

### **Simulations**

Simulations are case presentations incorporating role-playing situations. The role players may be other participants, programmed (standardized) patients, or manikins. Simulations work best when they are realistic and present situations the participant(s) may encounter, highlighting key points of the content area. Instructors and participants may critique simulations if the classroom environment is adequate.

### **Technology**

We live in a time when technology is expanding in development and practical use. Though it is hard to say what will be the state of the art delivery system for education resources in the future, participation by the student will likely enhance the learning process.

## **DISTRIBUTED LEARNING**

Distributed learning includes several alternative methods and media usage. Self-study programs, videotapes, audiotapes, and computer-based instruction are just a few examples of distributed learning. These alternative methods of instruction provide an opportunity to review and learn new cognitive knowledge, but they may not replace the need to practice or demonstrate a psychomotor skill. The use of a distributed learning process may best be applied in the remediation of cognitive knowledge identified in a needs assessment. Course directors and the credentialing agency should evaluate distributed learning products to assure that they meet the course goals and objectives.

## EVALUATING THE PARTICIPANTS

In order for the refresher program sponsor to issue a certificate of program completion an evaluation process must be employed. The evaluation process should measure both cognitive knowledge and psychomotor skills. Individuals who are unsuccessful may be counseled and a course of action for remediation developed.

### COGNITIVE EVALUATION

Authoring a valid written evaluation is both a science and an art. While some instructors possess skills in writing test questions, some others may not. A variety of commercially available test question banks may be useful to the instructional staff during the refresher program. Regardless of the tool used, the purpose of the cognitive measurement tool must be known before a test can be validated. The instructional staff must use basic test construction principles to develop written evaluation instruments.

Written evaluation questions should be balanced to the program content. Items should be based upon what is taught and emphasized throughout the program and should have a difficulty measurement. A test written so each participant can obtain a score of 90% without taking the course lacks measurement ability and validation. Test items must be reviewed by faculty members, including the course medical director, to ensure content validation. Correct answers need to be the best choice or the only correct answer. Incorrect answers and distracters should be plausible to the item and have some attraction to the less than competent participant. Finally, a pass/fail score should be established based upon item analysis and judgment by faculty members responsible for issuing course completion certificates.

### PSYCHOMOTOR EVALUATION

The following have been identified as essential items in the 2001 EMT-Paramedic Refresher Program:

- Trauma assessment
- Medical assessment
- Ventilation
  - Adult
  - Pediatric
- Cardiac arrest management
  - Adult
  - Pediatric
- Medication administration
  - Intravenous
  - Intraosseous
- Oral scenarios

- Basic skills
  - Seated spinal immobilization
  - Femoral/longbone immobilization
  - Wounds, bleeding, and shock management
- Lifting, moving, and carrying patients

Validation of psychomotor performance must be accomplished prior to issuing a certificate of course completion. Three opportunities are available to the instructional staff to validate a participant's performance.

### **Pretest**

The use of a psychomotor pretest is the best measurement of an individual's performance. The pretest identifies skills that need to be emphasized during the course. Likewise, if all candidates possess competency in a skill prior to taking the program, it may not be necessary to cover that skill.

### **Skill Labs**

When the sponsoring agency does not administer a pretest, the staff can use the skill labs to measure the competency of each participant. The skill labs ensure validation is sprinkled throughout the refresher program.

### **End of Program**

At the end of the refresher program an evaluation process can be utilized if a pretest and skill labs were not used. If an end of program evaluation process is used, some skills may need to be re-evaluated if participants are unsuccessful.

Participants must have documentation of demonstrating competence for each skill identified during the program regardless of what process is used.

The refresher curriculum is the minimum acceptable content to be covered by education programs. With certifying agency approval, the student may meet some program objectives by satisfactorily completing a nationally recognized trauma life support program, cardiac care program, or pediatric care program. Although some certifying agencies allow providers to attend continuing education programs, it is recommended that providers participate in regularly scheduled group education sessions as well.

## **REMEDATION**

Participants who do not complete the program's objectives or pass the evaluation process should have their performance reviewed by one of the instructional staff members. The participant's strengths and weaknesses should be identified and a plan developed that helps the participant successfully complete the requirements. This plan may include additional classroom time, clinical time, field time, or repeating the entire program.

## PROGRAM EVALUATION

Refresher programs are often provided by the same instructional staff in a variety of settings to different groups of participants. The program staff should evaluate each program for its effectiveness when completed. The evaluation can include the participant's point of view by administering post program evaluation surveys.

Some questions to ask when evaluating program effectiveness include:

- Did the program conform to the course design?
- Were the resources adequate?
- Were the skills labs effective?
- Did the test provide valuable information?
- Were the instructors effective in delivering the material?
- Can other instructional methods be incorporated in future courses?
- What were the participant comments?
- Was the course cost effective?

At the end of each program, the faculty and course medical director must meet to determine if the course met its desired needs. The faculty needs to review content design, measurements, course completion criteria, and participant comments. Adjustments to future programs may be indicated once the evaluation process is complete.

# Acknowledgments

The development of this document would not have been possible without the involvement and help of the following task force members and organizations. Gratitude and thanks are also extended to all the individuals who made comments during the development of this document.

## Refresher Curriculum Development Task Force Members

**Linda M. Abrahamson**

Education Coordinator  
Silver Cross Hospital  
Joliet, Illinois  
**NAEMT**

**Mike Armacost**

Director  
Colorado Department of Health  
Prehospital Care Program  
Denver, Colorado  
**NAEMSD**

**David Bryson**

EMS Specialist  
NHTSA  
Washington, DC  
**NHTSA**

**William E. Brown Jr.**

Executive Director  
National Registry of EMTs  
Columbus, Ohio  
**NREMT**

**Debra Cason**

EMS Program Director  
UT Southwestern Medical Center  
Dallas, Texas  
**NAEMSE Project Director**

**Russell Crowley**

EMS Education Director  
Alabama Department of Health  
EMS Division  
Montgomery, Alabama  
**NCSEMSTC**

**Joann Freel**

Executive Director  
National Association of EMS Educators  
Carnegie, Pennsylvania  
**NAEMSE Task Force Administrator**

**Art Hsieh**

Section Chief – EMS Inservice Training  
San Francisco Fire Department  
San Francisco, California  
**NAEMSE**

**Jon Krohmer, MD**

Kent County EMS  
Grand Rapids, Michigan  
**NAEMSP**

**David LaCombe**

Deputy Chief  
Sanibel Fire Rescue District  
Sanibel, Florida  
**Expert Writer**

**Dennis Mitchell**

EMS Instructor  
University of Arkansas for Medical Sciences  
Little Rock, Arkansas  
**NAEMT**

**Steve Mercer**

Education Coordinator  
Iowa Department of Public Health  
Bureau of EMS  
Des Moines, Iowa  
**NAEMSE Project Coordinator**

**Robert K. Waddell II**

Director – EMS Systems  
MCHB/EMSC National Resource Center  
Washington, DC  
**MCHB/EMSC**

# **Module I: *Airway* / *Ventilation***

**NREMT PRACTICE ANALYSIS TASK ITEM**

- Provide ventilatory support for a patient.

**COGNITIVE OBJECTIVES**

At the completion of this unit, the paramedic will be able to:

- 1.1 Describe the indications, contraindications, advantages, disadvantages, complications, and technique for ventilating a patient by: (C-1) / 2-1.43
  - Mouth-to-mouth
  - Mouth-to-nose
  - Mouth-to-mask
  - One person bag-valve-mask
  - Two person bag-valve-mask
  - Three person bag-valve-mask
  - Flow-restricted, oxygen-powered ventilation device
- 1.2 Compare the ventilation techniques used for an adult patient to those used for pediatric patients. (C-3) / 2-1.45
- 1.3 Describe indications, contraindications, advantages, disadvantages, complications, and technique for ventilating a patient with an automatic transport ventilator (ATV). (C-1) / 2-1.46
- 1.4 Define how to ventilate with a patient with a stoma, including mouth-to-stoma and bag-valve-mask-to-stoma ventilation. (C-1) / 2-1.54
- 1.5 Describe the special considerations in airway management and ventilation for patients with facial injuries. (C-1) / 2-1.55
- 1.6 Describe the special considerations in airway management and ventilation for the pediatric patient. (C-1) / 2-1.56

**PSYCHOMOTOR OBJECTIVES**

At the completion of this unit, the paramedic will be able to:

- 1.7 Demonstrate ventilating a patient by the following techniques: (P-2) / 2-1.95
  - Mouth-to-mask ventilation
  - One person bag-valve-mask
  - Two person bag-valve-mask
  - Three person bag-valve-mask
  - Flow-restricted, oxygen-powered ventilation device
  - Automatic transport ventilator
  - Mouth-to-stoma
  - Bag-valve-mask-to-stoma ventilation
- 1.8 Ventilate a pediatric patient using the one and two person techniques. (P-2) / 2-1.96
- 1.9 Perform bag-valve-mask ventilation with an in-line small-volume nebulizer. (P-2) / 2-1.97
- 1.10 Perform assessment to confirm correct placement of the endotracheal tube (P-2) / 2-1.103
- 1.11 Intubate the trachea by the following methods:
  - Orotracheal intubation
  - Nasotracheal intubation
  - Multi-lumen airways
- 1.12 Perform transtracheal catheter ventilation (needle cricothyrotomy). (P-2) / 2-1.107

DECLARATIVE

I Ventilation

A Mouth-to-mouth

- 1 Most basic form of ventilation
- 2 Indications
  - a Apnea from any mechanism when other ventilation devices are not available
- 3 Contraindications
  - a Awake patients
  - b Communicable disease risk limitations
- 4 Advantages
  - a No special equipment required
  - b Delivers excellent tidal volume
  - c Delivers adequate oxygen
- 5 Disadvantages
  - a Psychological barriers from
    - i Sanitary issues
    - ii Communicable disease issues
      - a) Direct blood/ body fluid contact
      - b) Unknown communicable disease risks at time of event
- 6 Complications
  - a Hyperinflation of patient's lungs
  - b Gastric distention
  - c Blood/ body fluid contact manifestation
  - d Hyperventilation of rescuer

B Mouth-to-nose

- 1 Ventilating through nose rather than mouth
- 2 Indications
  - a Apnea from any mechanism
- 3 Contraindications
  - a Awake patients
- 4 Advantages
  - a No special equipment required
- 5 Disadvantages
  - a Direct blood/ body fluid contact
  - b Psychological limitations of rescuer
- 6 Complications
  - a Hyperinflation of patient's lungs
  - b Gastric distention
  - c Blood/ body fluid manifestation
  - d Hyperventilation of rescuer

C Mouth-to-mask

- 1 Adjunct to mouth-to-mouth ventilation
- 2 Indications
  - a Apnea from any mechanism
- 3 Contraindications
  - a Awake patients

- 4 Advantages
  - a Physical barrier between rescuer and patient blood/ body fluids
  - b One-way valve to prevent blood/ body fluid splash to rescuer
  - c May be easier to obtain face seal
- 5 Disadvantages
  - a Useful only if readily available
- 6 Complications
  - a Hyperinflation of patient's lungs
  - b Hyperventilation of rescuer
  - c Gastric distention
- 7 Method for use
  - a Position head by appropriate method
  - b Position and seal mask over mouth and nose
  - c Ventilate as appropriate
- D One person bag-valve-mask
  - 1 Fixed volume self inflating bag can deliver adequate tidal volumes and O<sub>2</sub> enrichment
  - 2 Indications
    - a Apnea from any mechanism
    - b Unsatisfactory respiratory effort
  - 3 Contraindications
    - a Awake, intolerant patients
  - 4 Advantages
    - a Excellent blood/ body fluid barrier
    - b Good tidal volumes
    - c Oxygen enrichment
    - d Rescuer can ventilate for extended periods without fatigue
  - 5 Disadvantages
    - a Difficult skill to master
    - b Mask seal may be difficult to obtain and maintain
    - c Tidal volume delivered is dependent on mask seal integrity
  - 6 Complications
    - a Inadequate tidal volume delivery
    - b Poor technique
    - c Poor mask seal
    - d Gastric distention
  - 7 Method for use
    - a Position appropriately
    - b Choose proper mask size – seats from bridge of nose to chin
    - c Position, spread/ mold/ seal mask
    - d Hold mask in place
    - e Squeeze bag completely over 1.5 to 2 seconds for adults
    - f Avoid overinflation
    - g Reinflate completely over several seconds
  - 8 Special considerations
    - a Medical
      - i Observe for
        - a) Gastric distention
        - b) Changes in compliance of bag with ventilation

- c) Improvement or deterioration of ventilation status (i.e., color change, responsiveness, air leak around mask)
    - b Trauma
      - i Very difficult to perform with cervical spine immobilization in place
- E Two-person bag-valve-mask ventilation method
  - 1 Most efficient method
  - 2 Indications
    - a Bag-valve-mask ventilation on any patient
      - i Especially useful for cervical spine immobilized patients
      - ii Difficulty obtaining or maintaining adequate mask seal
  - 3 Contraindications
    - a Awake, intolerant patients
  - 4 Advantages
    - a Superior mask seal
    - b Superior volume delivery
  - 5 Disadvantages
    - a Requires extra personnel
  - 6 Complications
    - a Hyperinflation of patient's lungs
    - b Gastric distention
  - 7 Method for use
    - a First rescuer maintains mask seal by appropriate method
    - b Second rescuer squeezes bag
  - 8 Special considerations
    - a Observe chest movement
    - b Avoid overinflation
    - c Monitor lung compliance with ventilations
- F Three-person bag-valve-mask ventilation
  - 1 Indications
    - a Bag-valve-mask ventilation on any patient
      - i Especially useful for cervical spine immobilized patients
      - ii Difficulty obtaining or maintaining adequate mask seal
  - 2 Contraindications
    - a Awake, intolerant patients
  - 3 Advantages
    - a Superior mask seal
    - b Superior volume density
  - 4 Disadvantages
    - a Requires extra personnel
    - b "Crowded" around airway
  - 5 Complications
    - a Hyperinflation of patient's lungs
    - b Gastric distention
  - 6 Method for use
    - a First rescuer maintains mask seal by appropriate method
    - b Second rescuer holds mask in place
    - c Third rescuer squeezes bag and monitors compliance

- 7 Special considerations
  - a Avoid overinflation
  - b Monitor lung compliance with ventilations
- G Flow-restricted, oxygen-powered ventilation devices
  - 1 The valve opening pressure at the cardiac sphincter is approx 30 cm H<sub>2</sub>O
  - 2 These devices operate at or below 30 cm H<sub>2</sub>O to prevent gastric distention
  - 3 Indications
    - a Delivery of high volume/ high concentration of O<sub>2</sub> (1 L/ sec)
    - b Awake compliant patients
    - c Unconscious patient with caution
  - 4 Contraindications
    - a Non-compliant patients
    - b Poor tidal volume
    - c Small children
  - 5 Advantages
    - a Self administered
    - b Delivers high volume/ high concentration O<sub>2</sub>
    - c O<sub>2</sub> delivered in response to inspiratory effort (no O<sub>2</sub> wasting)
    - d O<sub>2</sub> volume delivery is regulated by inspiratory effort minimizing overinflation risk
    - e O<sub>2</sub> volume delivery is also restricted to less than 30 cm H<sub>2</sub>O
  - 6 Disadvantages
    - a Cannot monitor lung compliance
    - b Requires O<sub>2</sub> source
  - 7 Complications
    - a Gastric distention
    - b Barotrauma
  - 8 Method
    - a Mask is held manually in place
    - b Negative pressure upon inspiration triggers O<sub>2</sub> delivery or medic triggers release button
    - c Patient is monitored for adequate tidal volume and oxygenation
- H Automatic transport ventilators
  - 1 Volume/ rate controlled
  - 2 Indications
    - a Extended ventilation of intubated patients
    - b In situations in which a BVM is used
    - c Can be used during CPR
  - 3 Contraindications
    - a Awake patients
    - b Obstructed airway
    - c Increased airway resistance
      - i Pneumothorax (after needle decompression)
      - ii Asthma
      - iii Pulmonary edema
  - 4 Advantages
    - a Frees personnel to perform other tasks
    - b Lightweight
    - c Portable

- d Durable
  - e Mechanically simple
  - f Adjustable tidal volume
  - g Adjustable rate
  - h Adapts to portable O<sub>2</sub> tank
- 5 Disadvantages
  - a Cannot detect tube displacement
  - b Does not detect increasing airway resistance
  - c Difficult to secure
  - d Dependent on O<sub>2</sub> tank pressure
- I Cricoid pressure – Sellick’s maneuver
  - 1 Pressure on cricoid Ring
  - 2 Occludes esophagus
  - 3 Facilitates intubation by moving the larynx posteriorly
  - 4 Helps to prevent passive emesis
  - 5 Can help minimize gastric distention during bag-valve-mask ventilation
  - 6 Indications
    - a Unconscious patients receiving BVM ventilations
    - b Patient cannot protect own airway
  - 7 Contraindications
    - a Use with caution in cervical spine injury
  - 8 Advantages
    - a Noninvasive
    - b Minimizes risk of aspiration as long as pressure is maintained
  - 9 Disadvantages
    - a May have extreme emesis if pressure is removed
    - b Second rescuer required for bag-valve-mask ventilation
    - c May further compromise injured cervical spine
  - 10 Complications
    - a Laryngeal trauma with excessive force
    - b Esophageal rupture from unrelieved high gastric pressures
    - c Excessive pressure may obstruct the trachea in small children
  - 11 Method
    - a Locate the anterior aspect of the cricoid ring
    - b Apply firm, posterior pressure
    - c Maintain pressure until the airway is secured with an endotracheal tube
- J Artificial ventilation of the pediatric patient
  - 1 Flat nasal bridge makes achieving mask seal more difficult
  - 2 Compressing mask against face to improve mask seal results in obstruction
  - 3 Mask seal best achieved with jaw displacement (two person bag-valve-mask)
  - 4 Bag-valve-mask ventilation
    - a Bag size
      - i Full-term neonates and infants – minimum of 450 ml tidal volume (pediatric BVM)
      - ii Children up to eight years of age – pediatric BVM preferred but adult-sized BVM (1500 ml) may be used
      - iii Children over eight years of age require adult-sized BVM for adequate ventilation

- iv Proper mask fit
    - v Length based resuscitation tape
    - vi Bridge of nose to cleft of chin
  - b Proper mask position and seal (EC-clamp)
    - i Place mask over mouth and nose; avoid compressing the eyes
    - ii Using one hand, place thumb on mask at apex and index finger on mask at chin (C-grip)
    - iii With gentle pressure, push down on mask to establish adequate seal
    - iv Maintain airway by lifting bony prominence of chin with remaining fingers forming an “E”; avoid placing pressure on the soft area under chin
    - v May use one or two rescuer technique
  - c Ventilate according to current standards
  - d Obtain chest rise with each breath
    - i Begin ventilation and say “squeeze”; provide just enough volume to initiate chest rise; **DO NOT OVERVENTILATE**
  - e Allow adequate time for exhalation
    - i Begin releasing the bag and say “release, release”
  - f Continue ventilations using “squeeze, release, release” method
  - g Assess BVM ventilation
    - i Look for adequate chest rise
    - ii Listen for lung sounds at third intercostal space, midaxillary line
    - iii Assess for improvement in color and/ or heart rate
  - h Apply cricoid pressure to minimize gastric inflation and passive regurgitation
    - i Locate cricoid ring by palpating the trachea for a prominent horizontal band inferior to the thyroid cartilage and cricothyroid membrane
    - ii Apply gentle downward pressure using one fingertip in infants and the thumb and index finger in children
    - iii Avoid excessive pressure as it may produce tracheal compression and obstruction in infants
- K Ventilation of stoma patients
  - 1 Mouth-to-stoma
    - a Locate stoma site and expose
    - b Pocket mask to stoma preferred
      - i Seal around stoma site, check for adequate ventilation
      - ii Seal mouth and nose if air leak evident
  - 2 Bag-valve-mask to stoma
    - a Locate stoma site and expose
    - b Seal around stoma site, check for adequate ventilation
    - c Seal mouth and nose if air leak evident
- L Translaryngeal cannula ventilation
  - 1 High volume/ high-pressure ventilation of lungs through cannulation of trachea below the glottis
    - a Oxygen delivery differs from other methods
    - b Delivers a large volume of O<sub>2</sub> through a small port

- c Delivers a very high pressure to the lungs compared to other methods (50 psi versus less than 1 psi through a regulator)
- 2 Indications
  - a Apnea
  - b Delayed or inability to ventilate the patient by other means
- 3 Contraindications
  - a Total airway obstruction (both inspiratory and expiratory)
  - b Equipment not immediately available
- 4 Advantages
  - a Rapidly performed
  - b Provides adequate ventilation when performed properly
  - c Does not manipulate the cervical spine
  - d Does not interfere with subsequent attempts to intubate
- 5 Disadvantages
  - a Requires jet ventilator
  - b Expends high volumes of oxygen more rapidly
  - c May not protect against aspiration
- 6 Equipment
  - a Large bore IV catheter (14-16 gauge)
  - b 10 cc syringe
  - c 3 ccs of water or saline (optional)
  - d Oxygen source (50 psi)
  - e Jet ventilator
- 7 Method
  - a Prepare equipment
  - b Identify cricothyroid membrane
  - c Insert needle with syringe midline through cricothyroid membrane at a slight angle towards sternum
  - d Withdraw on syringe plunger until air is freely withdrawn (bubbles if fluid is in syringe)
  - e Advance additional 1 cm
  - f Hold needle steady, advance catheter to hub
  - g Attach jet ventilator
  - h Ventilate once per five seconds
  - i Exhalation is passive through the glottis
- 8 Complications
  - a Bleeding
    - i From improper catheter placement
  - b Subcutaneous emphysema
    - i From excessive air leak around catheter site or undetected laryngeal trauma
  - c Airway obstruction
    - i Result of excessive bleeding or subcutaneous air which compresses trachea
  - d Barotrauma
    - i Resulting from overinflation
  - e Hypoventilation

**II Airway Techniques**

- A Endotracheal intubation techniques
  - 1 Medical patient
    - a Orotracheal intubation by direct laryngoscopy
  - 2 Trauma patient
    - a Orotracheal intubation by direct laryngoscopy
    - b Nasotracheal intubation techniques
      - i Indications
  - 3 Confirming placement
    - a Direct re-visualization
    - b Tube condensation
    - c Auscultation
    - d Palpation of balloon cuff at sternal notch
    - e Pulse oximetry
    - f Expired CO<sub>2</sub>
    - g Bag-valve ventilation compliance
  - 4 Field extubation
  - 5 Endotracheal tube securing device
- B Multi-lumen airways
  - 1 Pharyngo-tracheal lumen airway
    - a Indications
    - b Advantages
    - c Disadvantages
    - d Method
    - e Complications
    - f Special considerations
  - 2 Combitube
    - a Indications
    - b Advantages
    - c Disadvantages
    - d Method
    - e Complications
    - f Special considerations

## **Module II: Cardiovascular**

**NREMT PRACTICE ANALYSIS TASK ITEMS**

- Provide care to a patient experiencing cardiovascular compromise.
- Attempt to resuscitate a patient in cardiac arrest.
- Provide post-resuscitation care to a cardiac arrest patient.

**COGNITIVE OBJECTIVES**

At the completion of this unit, the paramedic will be able to:

- 2.1 Identify the major therapeutic objectives in the treatment of patients with any arrhythmia. (C-1) / 5-2.51
- 2.2 Identify the major mechanical, pharmacological and electrical therapeutic interventions. (C-3) / 5-2.52
- 2.3 Based on field impressions, identify the need for rapid intervention for the patient in cardiovascular compromise. (C-3) / 5-2.53
- 2.4 Identify the clinical indications for transcutaneous and permanent artificial cardiac pacing. (C-1) / 5-2.55
- 2.5 Describe the components and the functions of a transcutaneous pacing system. (C-1) / 5-2.56
- 2.6 Explain what each setting and indicator on a transcutaneous pacing system represents and how the settings may be adjusted. (C-2) / 5-2.57
- 2.7 Describe the techniques of applying a transcutaneous pacing system. (C-1) / 5-2.58
- 2.8 Specify the measures that may be taken to prevent or minimize complications in the patient suspected of myocardial infarction. (C-3) / 5-2.83
- 2.9 Describe the most commonly used cardiac drugs in terms of therapeutic effect and dosages, routes of administration, side effects and toxic effects. (C-3) / 5.2.84
- 2.10 List the interventions prescribed for the patient in acute congestive heart failure. (C-2) / 5-2.94
- 2.11 Describe the most commonly used pharmacological agents in the management of congestive heart failure in terms of therapeutic effect, dosages, routes of administration, side effects and toxic effects. (C-1) / 5-2.95
- 2.12 Identify the paramedic responsibilities associated with management of a patient with cardiac tamponade. (C-2) / 5-2.101
- 2.13 From the priority of clinical problems identified, state the management responsibilities for the patient with a hypertensive emergency. (C-2) / 5-2.109
- 2.14 Identify the drugs of choice for hypertensive emergencies, rationale for use, clinical precautions and disadvantages of selected antihypertensive agents. (C-3) / 5-2.110
- 2.15 Describe the most commonly used pharmacological agents in the management of cardiogenic shock in terms of therapeutic effects, dosages, routes of administration, side effects and toxic effects. (C-2) / 5-2.118
- 2.16 Identify the paramedic responsibilities associated with management of a patient in cardiogenic shock. (C-2) / 5-2.120
- 2.17 Identify the critical actions necessary in caring for the patient with cardiac arrest. (C-3) / 5-2.125
- 2.18 Describe the most commonly used pharmacological agents in the management of cardiac arrest in terms of therapeutic effects. (C-3) / 5-2.129
- 2.19 Develop, execute, and evaluate a treatment plan based on field impression for the patient in need of a pacemaker. (C-3) / 5-2.158
- 2.20 Develop, execute, and evaluate a treatment plan based on the field impression for the heart failure patient. (C-3) / 5-2.168

- 2.21 Develop, execute and evaluate a treatment plan based on the field impression for the patient with cardiac tamponade. (C-3) / 5-2.171
- 2.22 Develop, execute and evaluate a treatment plan based on the field impression for the patient with a hypertensive emergency. (C-3) / 5-2.171
- 2.23 Develop, execute, and evaluate a treatment plan based on the field impression for the patient with cardiogenic shock. (C-3) / 5-2.177
- 2.24 Integrate pathophysiological principles to the assessment and field management of a patient with chest pain. (C-3) / 5-2.183

**PSYCHOMOTOR OBJECTIVES**

At the completion of this unit, the paramedic will be able to:

- 2.25 Set up and apply a transcutaneous pacing system. (P-3) / 5-2.202
- 2.26 Given the model of a patient with signs and symptoms of heart failure, position the patient to afford comfort and relief. (P-2) / 5-2.203
- 2.27 Demonstrate satisfactory performance of psychomotor skills of basic and advanced life support techniques according to the current American Heart Association Standards and Guidelines, including: (P-3) / 5-2.205
  - Cardiopulmonary resuscitation
  - Defibrillation
  - Synchronized cardioversion
  - Transcutaneous pacing

DECLARATIVE

- I Management of the patient with arrhythmias
  - A Assessment
  - B Pharmacological
    - 1 Gases (such as oxygen)
    - 2 Sympathetic (such as epinephrine)
    - 3 Anticholinergic (such as atropine)
    - 4 Antiarrhythmic (such as lidocaine)
    - 5 Beta blocker
      - a Selective (such as metoprolol)
      - b Non-selective (such as propranolol)
    - 6 Vasopressor (such as dopamine)
    - 7 Calcium channel blocker (such as verapamil)
    - 8 Purine nucleoside (such as adenosine)
    - 9 Platelet aggregate inhibitor (such as aspirin)
    - 10 Alkalinizing agents (such as sodium bicarbonate)
    - 11 Cardiac glycoside (such as digitalis)
    - 12 Narcotic/ analgesic (such as morphine)
    - 13 Diuretic (such as furosemide)
    - 14 Nitrate (such as nitroglycerin)
    - 15 Antihypertensive (such as sodium nitroprusside)
  - C Electrical
    - 1 Purpose
    - 2 Methods
      - a Synchronized cardioversion
      - b Defibrillation
    - 3 Cardiac pacing
      - a Implanted pacemaker functions
        - i Characteristics
        - ii Pacemaker artifact
        - iii ECG tracing of capture
        - iv Failure to sense
          - a) ECG findings
          - b) Clinical significance
        - v Failure to capture
          - a) ECG findings
          - b) Clinical significance
        - vi Failure to pace
          - a) ECG findings
          - b) Clinical significance
        - vii Pacer-induced tachycardia
          - a) ECG findings
          - b) Clinical significance
          - c) Treatment
      - b Transcutaneous pacing
        - i Criteria for use
        - ii Bradycardia

- a) Patient is hypotensive/ hypoperfusing
      - b) No change with pharmacologic intervention
    - iii Second degree AV block
      - a) Patient is hypotensive/ hypoperfusing
      - b) No change with pharmacologic intervention
    - iv Complete AV block
      - a) Patient is hypotensive/ hypoperfusing
      - b) No change with pharmacologic intervention
    - v Asystole
    - vi Overdrive
      - a) Deter occurrence of recurrent tachycardia
  - 4 Set-up
    - a Placement of electrodes
    - b Rate and milliampere (mA) settings
    - c Pacer artifact
    - d Capture
    - e Failure to sense
      - i Causes
      - ii Implications
      - iii Interventions
    - f Failure to capture
      - i Causes
      - ii Implications
      - iii Interventions
    - g Failure to pace
      - i Causes
      - ii Implications
      - iii Interventions
    - h Hazards
    - i Complications
      - i Interventions
- D Transport
  - 1 Indications for rapid transport
  - 2 Indications for no transport required
  - 3 Indications for referral
- E Support and communications strategies
  - 1 Explanation for patient, family, significant others
  - 2 Communications and transfer of data to the physician

**II Myocardial infarction**

- A Epidemiology
- B Morbidity / Mortality
- C Initial Assessment Findings
- D Focused History
- E Detailed Physical Exam
- F Management
  - 1 Position of comfort
  - 2 Pharmacological

- a Gases
- b Nitrates
- c Platelet aggregate inhibitor
- d Analgesia
- e Increase or decrease heart rate
- f Possible antiarrhythmic
- g Possible antihypertensives
- 3 Electrical
  - a Constant ECG monitoring
  - b Defibrillation/ synchronized cardioversion
  - c Transcutaneous pacing
- 4 Transport
  - a Criteria for rapid transport
    - i No relief with medications
      - a) Hypotension/ hypoperfusion
      - b) Significant changes in ECG
  - b ECG criteria for rapid transport and reperfusion
    - i Time of onset of pain
    - ii ECG rhythm abnormalities
  - c Indications for “no transport”
    - i Refusal
    - ii No other indications for no-transport
  - d Support and communications strategies
    - i Explanation for patient, family, significant others
    - ii Communications and transfer of data to the physician

**III Heart failure**

- A Epidemiology
- B Morbidity / Mortality
- C Initial Assessment
- D Focused History
- E Detailed Physical Exam
- F Complications
- G Management
  - 1 Position of comfort
  - 2 Pharmacological
    - a Gases
    - b Afterload reduction
    - c Analgesia
    - d Diuresis
    - e Other
  - 3 Transport
    - a Refusal
    - b No other indications for no-transport
- H Support and communications strategies
  - 1 Explanation for patient, family, significant others
  - 2 Communications and transfer of data to the physician

- IV Cardiac tamponade
  - A Pathophysiology
  - B Morbidity / Mortality
  - C Initial Assessment
  - D Focused History
  - E Detailed Physical Examination
  - F Management
    - 1 Airway management and ventilation
    - 2 Circulation
    - 3 Pharmacological
    - 4 Non-pharmacological
    - 5 Rapid transport for pericardiocentesis
  - G Support and communications strategies
    - 1 Explanation for patient, family, significant others
    - 2 Communications and transfer of data to the physician
  
- V Hypertensive Emergencies
  - A Epidemiology and precipitating causes
  - B Mortality / Morbidity
    - 1 Hypertensive encephalopathy
    - 2 Stroke
  - C Initial Assessment
    - 1 Airway/breathing
    - 2 Circulation
  - D Focused History
    - 1 Chief complaint
    - 2 Medication history
    - 3 Home oxygen use
  - E Detailed Physical Examination
    - 1 Airway
    - 2 Breathing
    - 3 Circulation
    - 4 Diagnostic signs/symptoms
  - F Management
    - 1 Non-pharmacologic
      - a Position of comfort
      - b Airway and ventilation
    - 2 Pharmacological
      - a Gases
      - b Other
    - 3 Rapid transport
      - a Refusal
      - b No other indications for no transport
  - G Support and communications strategies
    - 1 Explanation for patient, family, significant others
    - 2 Communications and transfer of data to the physician

**VI** Cardiogenic Shock

- A Pathophysiology
- B Initial Assessment
- C Focused History
- D Detailed Physical Examination
- E Management
  - 1 Position of comfort
    - a May prefer sitting upright with legs in dependent position
  - 2 Pharmacological
    - a Gases
    - b Vasopressor
    - c Analgesia
    - d Diuretics
    - e Glycoside
    - f Sympathetic agonist
    - g Alkalinizing agent
    - h Other
- F Transport
  - 1 Refusal
  - 2 No other indications for no transport
- G Support and communications strategies
  - 1 Explanation for patient, family, significant others
  - 2 Communications and transfer of data to the physician

**VII** Cardiac arrest

- A Pathophysiology
- B Initial assessment
- C Focused history
- D Management
  - 1 Related terminology
    - a Resuscitation – to provide efforts to return spontaneous pulse and breathing to the patient in full cardiac arrest
    - b Survival – patient is resuscitated and survives to hospital discharge
    - c Return of spontaneous circulation (ROSC) – patient is resuscitated to the point of having pulse without CPR; may or may not have return of spontaneous respirations; patient may or may not go on to survive
  - 2 Indications for NOT initiating resuscitative techniques
    - a Signs of obvious death
      - i For example – rigor; fixed lividity; decapitation
    - b Local protocol
      - i For example – out-of-hospital advance directives
  - 3 Advanced airway management and ventilation
  - 4 Circulation
    - a CPR in conjunction with defibrillation
    - b IV therapy
    - c Defibrillation
    - d Pharmacological

- i Gases (oxygen)
  - ii Sympathetic
  - iii Anticholinergic
  - iv Antiarrhythmic
  - v Vasopressor
  - vi Alkalinizing agents
  - vii Parasympatholytic
- 5 Rapid transport
- 6 Support and communications strategies
- a Explanation for patient, family, significant others
  - b Communications and transfer of data to the physician

## **Module III: Medical**

**NREMT PRACTICE ANALYSIS TASK ITEMS**

- Assess a patient experiencing an allergic reaction
- Provide care to the patient experiencing an allergic reaction
- Assess a near drowning patient
- Provide care to a near drowning patient
- Assess a patient with a possible overdose

**COGNITIVE OBJECTIVES**

At the completion of this unit, the paramedic will be able to:

- 3.1 Describe physical manifestations in anaphylaxis. (C-1) / 5-5.13
- 3.2 Differentiate manifestations of an allergic reaction from anaphylaxis. (C-3) / 5-5.14
- 3.3 Recognize the signs and symptoms related to anaphylaxis. (C-1) / 5-5.15
- 3.4 Differentiate among the various treatment and pharmacological interventions used in the management of anaphylaxis. (C-3) / 5-5.16
- 3.5 Correlate abnormal findings in assessment with the clinical significance in the patient with anaphylaxis. (C-3) / 5-5.18
- 3.6 Develop a treatment plan based on field impression in the patient with allergic reaction and anaphylaxis. (C-3) / 5-5.19
- 3.7 List signs and symptoms of near-drowning. (C-1) 5-10.54
- 3.8 Describe the lack of significance of fresh versus saltwater immersion, as it relates to near-drowning. (C-3) / 5-10.55
- 3.9 Discuss the incidence of "wet" versus "dry" drownings and the differences in their management. (C-3) 5-10.56
- 3.10 Discuss the complications and protective role of hypothermia in the context of near-drowning. (C-1) / 5-10.57
- 3.11 Correlate the abnormal findings in assessment with the clinical significance in the patient with near-drowning. (C-3) / 5-10.58
- 3.12 Differentiate among the various treatments and interventions in the management of near-drowning. (C-3) 5-10.59
- 3.13 Integrate pathophysiological principles and assessment findings to formulate a field impression and implement a treatment plan for the near-drowning patient. (C-3) / 5-10.60
- 3.14 Differentiate toxic substance emergencies based on assessment findings. (C-3) / 5-8.60
- 3.15 Correlate abnormal findings in the assessment with the clinical significance in the patient exposed to a toxic substance. (C-3) / 5-8.61
- 3.16 Correlate the abnormal findings in assessment with the clinical significance in patients with the most common poisonings by overdose. (C-3) / 5-8.44
- 3.17 Correlate the abnormal findings in assessment with the clinical significance in patients using the most commonly abused drugs. (C-3) / 5-8.53
- 3.18 List the clinical uses, street names, pharmacology, assessment finding and management for patient who have taken the following drugs or been exposed to the following substances: (C-1) / 5-8.56
  - Cocaine
  - Marijuana and cannabis compounds
  - Amphetamines and amphetamine-like drugs
  - Barbiturates
  - Sedative-hypnotics

- Cyanide
- Narcotics/ opiates
- Cardiac medications
- Caustics
- Common household substances
- Drugs abused for sexual purposes/ sexual gratification
- Carbon monoxide
- Alcohols
- Hydrocarbons
- Psychiatric medications
- Newer anti-depressants and serotonin syndromes
- Lithium
- MAO inhibitors
- Non-prescription pain medications
- Nonsteroidal antiinflammatory agents
- Salicylates
- Acetaminophen
- Metals
- Plants and mushrooms

DECLARATIVE

- I Anaphylaxis
  - A Epidemiology
  - B Pathophysiology
  - C Assessment findings
    - 1 Not all signs and symptoms are present in every case
    - 2 History
      - a Previous exposure
      - b Previous experience to exposure
      - c Onset of symptoms
      - d Dyspnea
    - 3 Level of consciousness
      - a Unable to speak
      - b Restless
      - c Decreased level of consciousness
      - d Unresponsive
    - 4 Upper airway
      - a Hoarseness
      - b Stridor
      - c Pharyngeal edema/ spasm
    - 5 Lower airway
      - a Tachypnea
      - b Hypoventilation
      - c Labored – accessory muscle use
      - d Abnormal retractions
      - e Prolonged expirations
      - f Wheezes
      - g Diminished lung sounds
    - 6 Skin
      - a Redness
      - b Rashes
      - c Edema
      - d Moisture
      - e Itching
      - f Urticaria
      - g Pallor
      - h Cyanotic
    - 7 Vital signs
      - a Tachycardia
      - b Hypotension
    - 8 Gastrointestinal
      - a Abnormal cramping
      - b Nausea/ vomiting
      - c Diarrhea
    - 9 Assessment tools
      - a Cardiac monitor
      - b Pulse oximetry low
      - c End tidal CO<sub>2</sub> high

- D Management of anaphylaxis
  - 1 Remove offending agent (i.e. remove stinger)
  - 2 Airway and ventilation
    - a Positioning
    - b Oxygen
    - c Assist ventilation
    - d Advanced airway
  - 3 Circulation
    - a Venous access
    - b Fluid resuscitation
  - 4 Pharmacological
    - a Oxygen
    - b Epinephrine – main stay of treatment
      - i Bronchodilator
      - ii Decrease vascular permeability
    - c Antihistamine
    - d Antiinflammatory/ immunosuppressant
    - e Vasopressor
  - 5 Psychological support
  - 6 Transport considerations
- E Management of allergic reaction
  - 1 Without dyspnea
    - a Antihistamine
  - 2 With dyspnea
    - a Oxygen
    - b Subcutaneous epinephrine
    - c Antihistamine

**II Near-Drowning**

- A Definition
  - 1 Submersion episode with at least transient recovery
- B Pathophysiology
  - 1 Wet versus dry drownings
    - a Fluid in posterior oropharynx stimulates laryngospasm
    - b Aspiration occurs after muscular relaxation
    - c Suffocation occurs with or without aspiration
    - d Aspiration presents as airway obstruction
  - 2 Fresh versus saltwater considerations
    - a Despite mechanistic differences, there is no difference in metabolic result
    - b No difference in out-of-hospital treatment
  - 3 Hypothermic considerations in near-drownings
    - a Common concomitant syndrome
    - b May be organ protective in cold-water near-drownings
    - c Always treat hypoxia first
    - d Treat all near-drowning patients for hypothermia
- C Treatment
  - 1 Establish airway

- a Conflicting recommendations regarding prophylactic abdominal thrusts
- b Questionable scientific data to support prophylactic abdominal thrusts
- c Ventilation
- d Oxygen
- 2 Trauma considerations
  - a Immersion episode of unknown etiology warrants trauma management
- 3 Post-resuscitation complications
  - a Adult respiratory distress syndrome (ARDS) or renal failure often occur post-resuscitation
  - b Symptoms may not appear for 24 hours or more, post-resuscitation
  - c All near-drowning patients should be transported for evaluation

**III General toxicology, assessment and management**

- A Types of toxicological emergencies
  - 1 Unintentional poisoning
    - a Dosage errors
    - b Idiosyncratic reactions
    - c Childhood poisoning
    - d Environmental exposure
    - e Occupational exposures
    - f Neglect and Abuse
  - 2 Drug/ alcohol abuse
  - 3 Intentional poisoning/ overdose
    - a Chemical warfare
    - b Assault/ homicide
    - c Suicide attempts
- B Use of poison control centers
- C Routes of absorption
  - 1 Ingestion
  - 2 Inhalation
  - 3 Injection
  - 4 Absorption
- D Poisoning by ingestion
  - 1 Examples
  - 2 Assessment findings
  - 3 General management considerations
- E Poisoning by inhalation
  - 1 Examples
  - 2 Assessment findings
  - 3 General management considerations
- F Poisoning by injection
  - 1 Examples
  - 2 Assessment findings
  - 3 General management considerations
- G Poisoning by absorption
  - 1 Examples
  - 2 Assessment findings

- 3 General management considerations
- H Alcoholism
  - 1 Epidemiology
  - 2 Psychological issues
  - 3 Psycho-social issues
  - 4 Pathophysiology of long term alcohol abuse
    - a End organ damage
    - b Malnutrition
    - c Withdrawal syndrome
  - 5 Assessment findings
- I Toxic syndromes
  - 1 Cholinergics
    - a Common causative agents
      - i Pesticides (organophosphates / carbamates)
      - ii Nerve agents (sarin / Soman)
    - b Assessment findings
      - i Headache
      - ii Dizziness
      - iii Weakness
      - iv Nausea
      - v SLUDGE (salivation, lacrimation, urination, defecation, GI upset, emesis)
      - vi Bradycardia, wheezing, bronchoconstriction, myosis, coma, convulsions
      - vii Diaphoresis, seizures
    - c Management
  - 2 Anticholinergic
    - a Common causative agents
    - b Assessment findings
    - c Management
  - 3 Hallucinogens
    - a Common causative agents
      - i lysergic acid diethylamide (LSD)
      - ii phenyclicidine (PCP)
      - iii Peyote
      - iv mushrooms
    - b Assessment findings
      - i Chest pain
    - c Management
  - 4 Narcotics/ opiates
    - a Common causative agents –
      - i heroin
      - ii morphine
      - iii codeine
      - iv meperidine
      - v propoxyphene
    - b Assessment findings
      - i Euphoria
      - ii Hypotension

- iii Respiratory depression/ arrest
- iv Nausea
- v Pinpoint pupils
- vi Seizures
- vii Coma
- c Management
- 5 Sympathomimetics
  - a Common causative agents
  - b Assessment findings
  - c Management

**IV** Specific toxicology, assessment and management

- A Cocaine
  - 1 Clinical uses
  - 2 Common causative agents
  - 3 Common street names
  - 4 Assessment findings
  - 5 Management
- B Marijuana and cannabis compounds
  - 1 Clinical uses
  - 2 Common causative agents
  - 3 Common street names
  - 4 Assessment findings
  - 5 Management
- C Amphetamines and amphetamine-like drugs
  - 1 Clinical uses
  - 2 Common causative agents
  - 3 Common street names
  - 4 Assessment findings
  - 5 Management
- D Barbiturates
  - 1 Clinical uses
  - 2 Common causative agents
  - 3 Common street names
  - 4 Assessment findings
  - 5 Management
- E Sedative-hypnotics
  - 1 Clinical uses
  - 2 Common causative agents
  - 3 Common street names
  - 4 Assessment findings
  - 5 Management
- F Cyanide
  - 1 Clinical uses
  - 2 Common causative agents
  - 3 Common street names
  - 4 Assessment findings
  - 5 Management

- G Narcotics/ opiates
  - 1 Clinical uses
  - 2 Common causative agents
  - 3 Common street names
  - 4 Assessment findings
  - 5 Management
- H Cardiac medications
  - 1 Clinical uses
  - 2 Common causative agents
  - 3 Common street names
  - 4 Assessment findings
  - 5 Management
- I Caustics
  - 1 Clinical uses
  - 2 Common causative agents
  - 3 Common street names
  - 4 Assessment findings
  - 5 Management
- J Common household poisonings
  - 1 Clinical uses
  - 2 Common causative agents
  - 3 Common street names
  - 4 Assessment findings
  - 5 Management
- K Drugs abused for sexual purposes/ sexual gratification
  - 1 Clinical uses
  - 2 Common causative agents
  - 3 Common street names
  - 4 Assessment findings
  - 5 Management
- L Carbon monoxide
  - 1 Clinical uses
  - 2 Common causative agents
  - 3 Common street names
  - 4 Assessment findings
  - 5 Management
- M Alcohols
  - 1 Clinical uses
  - 2 Common causative agents
  - 3 Common street names
  - 4 Assessment findings
  - 5 Management
- N Hydrocarbons
  - 1 Clinical uses
  - 2 Common causative agents
  - 3 Common street names
  - 4 Assessment findings
  - 5 Management

- O Tricyclic antidepressants
  - 1 Clinical uses
  - 2 Common causative agents
  - 3 Common street names
  - 4 Assessment findings
  - 5 Management
- P Newer anti-depressants and serotonin syndromes
  - 1 Clinical uses
  - 2 Common causative agents
  - 3 Common street names
  - 4 Assessment findings
  - 5 Management
- Q Lithium
  - 1 Clinical uses
  - 2 Common causative agents
  - 3 Common street names
  - 4 Assessment findings
  - 5 Management
- R Non-prescription pain medications
  - 1 Clinical uses
  - 2 Common causative agents
  - 3 Common street names
  - 4 Assessment findings
  - 5 Management
- S Nonsteroidal anti-inflammatory agents
  - 1 Salicylates
  - 2 Clinical uses
  - 3 Common causative agents
  - 4 Common street names
  - 5 Assessment findings
  - 6 Management
- T Acetaminophen
  - 1 Clinical uses
  - 2 Common causative agents
  - 3 Common street names
  - 4 Assessment findings
  - 5 Management
- U Metals
  - 1 Clinical uses
  - 2 Common causative agents
  - 3 Common street names
  - 4 Assessment findings
  - 5 Management
- V Plants and mushrooms
  - 1 Clinical uses
  - 2 Common causative agents
  - 3 Common street names
  - 4 Assessment findings
  - 5 Management

## **Module IV: Trauma**

**NREMT PRACTICE ANALYSIS TASK ITEMS**

- Perform a rapid trauma assessment
- Provide care to a patient with shock (hypoperfusion)
- Assess a patient with a head injury
- Assess a patient with a suspected spinal injury
- Provide care to a patient with a suspected spinal injury
- Provide care to a patient with a chest injury
- Provide care to a patient with an open abdominal injury

**COGNITIVE OBJECTIVES**

At the completion of this unit, the paramedic will be able to:

- 4.1 State the reasons for performing a rapid trauma assessment. (C-1) / 3-3.35
- 4.2 Recite examples and explain why patients should receive a rapid trauma assessment. (C-1) / 3-3.36
- 4.3 Apply the techniques of physical examination to the trauma patient. (C-1) / 3-3.37
- 4.4 Describe the areas included in the rapid trauma assessment and discuss what should be evaluated. (C-1) / 3-3.38
- 4.5 Differentiate cases when the rapid assessment may be altered in order to provide patient care. (C-3) / 3-3.39
- 4.6 Discuss the treatment plan and management of hemorrhage and shock. (C-1) / 4-2.8
- 4.7 Develop, execute and evaluate a treatment plan based on the field impression for the hemorrhage or shock patient. (C-3) / 4-2.44
- 4.8 Relate assessment findings associated with head/ brain injuries to the pathophysiologic process. (C-3) / 4-5.43
- 4.9 Classify head injuries (mild, moderate, severe) according to assessment findings. (C-2) / 4-5.44
- 4.10 Relate assessment findings associated with concussion, moderate and severe diffuse axonal injury to pathophysiology. (C-3) / 4-5.49
- 4.11 Relate assessment findings associated with skull fracture to pathophysiology. (C-3) / 4-5.52
- 4.12 Relate assessment findings associated with cerebral contusion to pathophysiology. (C-3) / 4-5.55
- 4.13 Relate assessment findings associated with intracranial hemorrhage to pathophysiology, including: (C-3) / 4-5.58
  - Epidural
  - Subdural
  - Intracerebral
  - Subarachnoid
- 4.14 Integrate the pathophysiological principles to the assessment of a patient with head/ brain injury. (C-3) / 4-5.63
- 4.15 Differentiate between the types of head/ brain injuries based on the assessment and history. (C-3) / 4-5.64
- 4.16 Formulate a field impression for a patient with a head/ brain injury based on the assessment findings. (C-3) / 4-5.65
- 4.17 Describe the assessment findings associated with spinal injuries. (C-1) / 4-6.6

- 4.18 Identify the need for rapid intervention and transport of the patient with spinal injuries. (C-1) / 4-6.8
- 4.19 Integrate the pathophysiological principles to the assessment of a patient with a spinal injury. (C-3) / 4-6.9
- 4.20 Differentiate between spinal injuries based on the assessment and history. (C-3) / 4-6.10
- 4.21 Formulate a field impression based on the assessment findings (spinal injuries). (C-3) / 4-6.11
- 4.22 Develop a patient management plan based on the field impression (spinal injuries). (C-3) / 4-6.12
- 4.23 Describe the assessment findings associated with traumatic spinal injuries. (C-1) / 4-6.14
- 4.24 Describe the management of traumatic spinal injuries. (C-1) / 4-6.15
- 4.25 Integrate pathophysiological principles to the assessment of a patient with a traumatic spinal injury. (C-3) / 4-6.16
- 4.26 Differentiate between traumatic and non-traumatic spinal injuries based on the assessment and history. (C-3) / 4-6.17
- 4.27 Formulate a field impression for traumatic spinal injury based on the assessment findings. (C-3) / 4-6.18
- 4.28 Develop a patient management plan for traumatic spinal injury based on the field impression. (C-3) / 4-6.19
- 4.29 Describe the assessment findings associated with non-traumatic spinal injuries. (C-1) / 4-6.21
- 4.30 Describe the management of non-traumatic spinal injuries. (C-1) / 4-6.22
- 4.31 Integrate pathophysiological principles to the assessment of a patient with non-traumatic spinal injury. (C-3) / 4-6.23
- 4.32 Differentiate between traumatic and non-traumatic spinal injuries based on the assessment and history. (C-3) / 4-6.24
- 4.33 Formulate a field impression for non-traumatic spinal injury based on the assessment findings. (C-3) / 4-6.25
- 4.34 Develop a patient management plan for non-traumatic spinal injury based on the field impression. (C-3) / 4-6.26
- 4.35 Discuss the management of thoracic injuries. (C-1) / 4-7.7
- 4.36 Identify the need for rapid intervention and transport of the patient with chest wall injuries. (C-1) / 4-7.11
- 4.37 Discuss the management of chest wall injuries. (C-1) / 4-7.12
- 4.38 Discuss the management of lung injuries. (C-1) / 4-7.15
- 4.39 Identify the need for rapid intervention and transport of the patient with lung injuries. (C-1) / 4-7.16
- 4.40 Discuss the management of myocardial injuries. (C-1) / 4-7.19
- 4.41 Identify the need for rapid intervention and transport of the patient with myocardial injuries. (C-1) / 4-7.20
- 4.42 Discuss the management of vascular injuries. (C-1) / 4-7.23
- 4.43 Identify the need for rapid intervention and transport of the patient with vascular injuries. (C-1) / 4-7.24
- 4.44 Discuss the management of diaphragmatic injuries. (C-1) / 4-7.27
- 4.45 Identify the need for rapid intervention and transport of the patient with diaphragmatic injuries. (C-1) / 4-7.28
- 4.46 Discuss the management of esophageal injuries. (C-1) / 4-7.31

- 4.47 Identify the need for rapid intervention and transport of the patient with esophageal injuries. (C-1) / 4-7.32
- 4.48 Discuss the management of tracheo-bronchial injuries. (C-1) / 4-7.35
- 4.49 Identify the need for rapid intervention and transport of the patient with tracheo-bronchial injuries. (C-1) / 4-7.36
- 4.50 Discuss the management of traumatic asphyxia. (C-1) / 4-7.39
- 4.51 Identify the need for rapid intervention and transport of the patient with traumatic asphyxia. (C-1) / 4-7.40
- 4.52 Develop a patient management plan based on the field impression (thoracic injuries). (C-3) / 4-7.44
- 4.53 Describe the management of abdominal injuries. (C-1) / 4-8.8
- 4.54 Develop a patient management plan for patients with abdominal trauma based on the field impression. (C-3) / 4-8.12
- 4.55 Formulate a field impression based upon the assessment findings for a patient with abdominal injuries. (C-3) / 4-8.36
- 4.56 Develop a patient management plan for a patient with abdominal injuries, based upon field impression. (C-3) / 4-8.37

**PSYCHOMOTOR OBJECTIVES**

At the completion of this unit, the paramedic will be able to:

- 4.57 Using the techniques of physical examination, demonstrate the assessment of a trauma patient. (P-2) / 3-3.77
- 4.58 Demonstrate the rapid trauma assessment used to assess a patient based on mechanism of injury. (P-2) / 3-3.78
- 4.59 Demonstrate the management of a patient with signs and symptoms of hemorrhagic shock. (P-2) / 4-2.46
- 4.60 Demonstrate the management of a patient with signs and symptoms of compensated hemorrhagic shock. (P-2) / 4-2.48
- 4.61 Demonstrate the management of a patient with signs and symptoms of decompensated hemorrhagic shock. (P-2) / 4-2.50
- 4.62 Demonstrate a clinical assessment to determine the proper management modality for a patient with a suspected traumatic spinal injury. (P-1) / 4-6.29
- 4.63 Demonstrate a clinical assessment to determine the proper management modality for a patient with a suspected non-traumatic spinal injury. (P-1) / 4-6.30
- 4.64 Demonstrate immobilization of the urgent and non-urgent patient with assessment findings of spinal injury from the following presentations: (P-1) / 4-6.31
  - Supine
  - Prone
  - Semi-prone
  - Sitting
  - Standing
- 4.65 Demonstrate preferred methods for stabilization of a helmet from a potentially spine injured patient. 4-6.33

- 4.66 Demonstrate the following techniques of management for thoracic injuries: (P-1) / 4-7.50
- Needle decompression
  - Fracture stabilization
  - Elective intubation
  - ECG monitoring
  - Oxygenation and ventilation
- 4.67 Demonstrate a clinical assessment to determine the proper treatment plan for a patient with suspected abdominal trauma. (P-1) / 4-8.41

DECLARATIVE

- I Focused history and physical exam – trauma patients
  - A Re-consider mechanism of injury
    - 1 Helps to identify priority patients
    - 2 Helps to guide the assessment
    - 3 Significant mechanism of injury
      - a Ejection from vehicle
      - b Death in same passenger compartment
      - c Falls > 20 feet
      - d Roll-over of vehicle
      - e High-speed vehicle collision
      - f Vehicle-pedestrian collision
      - g Motorcycle crash
      - h Unresponsive or altered mental status
      - i Penetrations of the head, chest, or abdomen
      - j Hidden injuries
        - i Seat belts
          - a) If buckled, may have produced injuries
          - b) If patient had seat belt on, it does not mean they do not have injuries
        - ii Airbags
          - a) May not be effective without seat belt
          - b) Patient can hit wheel after deflation
          - c) Lift the deployed airbag and look at the steering wheel for deformation
    - 4 Additional infant and child considerations
      - a Falls >10 feet
      - b Bicycle collision
      - c Vehicle in medium speed collision
  - B Perform rapid trauma physical examination on patients with significant mechanism of injury to determine life-threatening injuries
    - 1 In the responsive patient, symptoms should be sought before and during the trauma assessment
    - 2 Continue spinal stabilization
    - 3 Reconsider transport decision
    - 4 Assess mental status
    - 5 As you inspect and palpate, look and feel for injuries or signs of injury
    - 6 Examination
      - a Assess the head, inspect and palpate for injuries or signs of injury
      - b Assess the neck, inspect and palpate for injuries or signs of injury
      - c Apply cervical spinal immobilization collar (CSIC) (may use information from the head injury unit at this time)
      - d Assess the chest
      - e Assess the abdomen, inspect and palpate for injuries or signs of injury
      - f Assess the pelvis, inspect and palpate for injuries or signs of injury
      - g Assess all four extremities, inspect and palpate for injuries or signs of injury

- h Roll patient with spinal precautions and assess posterior body, inspect and palpate, examining for injuries or signs of injury
- i Look for medical identification devices
- j Assess baseline vital signs
- k Assess patient history
- l Chief complaint
- m History of present illness
- n Past medical history
- o Current health status

**II Shock**

- A Epidemiology
- B Pathophysiology
- C Stages of Shock
- D Assessment
- E Management/ treatment plan
  - 1 Airway and ventilatory support
    - a Ventilate and suction as necessary
    - b Administer high concentration oxygen
    - c Reduce increased intrathoracic pressure in tension pneumothorax
  - 2 Circulatory support
    - a Hemorrhage control
    - b Intravenous volume expanders
      - i Types
        - a) Isotonic solutions
        - b) Hypertonic solutions
        - c) Synthetic solutions
        - d) Blood and blood products
        - e) Experimental solutions
        - f) Blood substitutes
      - ii Rate of administration
        - a) External hemorrhage that can be controlled
        - b) External hemorrhage that can not be controlled
        - c) Internal hemorrhage
    - c Pneumatic anti-shock garment
      - i Effects
        - a) Increased arterial blood pressure above garment
        - b) Increased systemic vascular resistance
        - c) Immobilization of pelvis and possibly lower extremities
        - d) Increased intra-abdominal pressure
      - ii Mechanism
        - a) Increases systemic vascular resistance through direct compression of tissues and blood vessels
        - b) Negligible autotransfusion effect
      - iii Indications
        - a) Hypoperfusion with unstable pelvis
        - b) Conditions of decreased SVR not corrected by other means

- c) As approved locally, other conditions characterized by hypoperfusion with hypotension
      - d) Research studies
    - iv Contraindications
      - a) Advanced pregnancy (no inflation of abdominal compartment)
      - b) Object impaled in abdomen or evisceration (no inflation of abdominal compartment)
      - c) Ruptured diaphragm
      - d) Cardiogenic shock
      - e) Pulmonary edema
    - v Needle chest decompression of tension pneumothorax to improve impaired cardiac output
    - vi Recognize the need for expeditious transport of suspected cardiac tamponade for pericardiocentesis
- 3 Pharmacological interventions
  - a Hypovolemic shock
    - i Volume expanders
  - b Cardiogenic shock
    - i Volume expanders
    - ii Positive cardiac inotropes
    - iii Vasoconstrictor
    - iv Rate altering medications
  - c Distributive shock
    - i Volume expanders
    - ii Positive cardiac inotropes
    - iii Vasoconstriction
    - iv PASG
  - d Obstructive shock
    - i Volume expanders
  - e Spinal shock
    - i Volume expanders
- 4 Psychological support/communication strategies
- 5 Transport considerations
  - a Indications for rapid transport
  - b Indications for transport to a trauma center
  - c Considerations for air medical transportation

**III Head trauma**

- A Review of anatomy and physiology
- B Mechanisms of injury
- C General categories of injury
- D Causes of brain injury
- E Head injury – broad and inclusive
- F Brain injury
- G Pathophysiology of head/brain injury
  - 1 Increased intracranial pressure
  - 2 Mechanism
  - 3 Assessment

- a Pressure exerted downward
  - i Cerebral cortices and/ or reticular activating system effected
    - a) Altered level of consciousness – amnesia of event, confusion, disorientation, lethargy or combativeness, focal deficit or weakness
  - ii Hypothalamus – vomiting
  - iii Brain stem
    - a) Blood pressure elevates to maintain MAP and thus CPP
    - b) Vagal nerve pressure – bradycardia
    - c) Respiratory centers – irregular respirations or tachypnea
    - d) Oculomotor nerve paralysis – unequal/ unreactive pupils
    - e) Posturing – flexion/ extension
  - iv Seizures – depending on location of injury
- b Levels of increasing ICP
  - i Cerebral cortex and upper brain stem involved
    - a) BP rising and pulse rate begins slowing
    - b) Pupils still reactive
    - c) Cheyne-Stokes respirations
    - d) Initially try to localize and remove painful stimuli
    - e) All effects reversible at this stage
  - ii Middle brain stem involved
    - a) Wide pulse pressure and bradycardia
    - b) Pupils nonreactive or sluggish
    - c) Central neurogenic hyperventilation (CNH)
    - d) Extension
    - e) Few patients function normally from this level
  - iii Lower portion of brain stem involved/ medulla
    - a) Pupil blown – same side as injury
    - b) Respirations ataxic (erratic, no rhythm) or absent
    - c) Flaccid
    - d) Labile pulse rate, irregular often great pulse swings in rate
    - e) QRS, S-T and T wave changes
    - f) Decreased BP, often labile BP
    - g) Not considered survivable
- c Glasgow coma scale – method to assess level of consciousness
  - i Three independent measurements
    - a) Eye opening
    - b) Verbal response
    - c) Motor response
  - ii Numerical score – 3 to 15
  - iii Head injury classified according to score
    - a) Mild – 13 to 15
    - b) Moderate – 8 to 12
    - c) Severe – < 8
    - d) Vital signs

- e) Pupil size and reaction
- f) Presence of focal deficit
- g) History of unconsciousness or amnesia of event
- iv Management
- H Specific Injuries – diffuse axonal injury and focal injuries
  - 1 Diffuse axonal injury – shearing, stretching or tearing of nerve fibers with subsequent axonal damage
    - a Concussion (mild DAI) – physiologic neurologic dysfunction without substantial anatomic disruption which results in transient episode of neuronal dysfunction with rapid return to normal neurologic activity
      - i Epidemiology
      - ii Assessment – confusion, disorientation, amnesia of the event
      - iii Management
  - 2 Moderate DAI – shearing, stretching or tearing results in minute petechial bruising of brain tissue, brain stem and reticular activating system may be involved leading to unconsciousness
    - a Epidemiology
    - b Assessment – may result in immediate unconsciousness or persistent confusion, disorientation and amnesia of the event extending to amnesia of moment-to-moment events; may have focal deficit; residual cognitive (inability to concentrate), psychologic (frequent periods of anxiety, uncharacteristic mood swings) and sensorimotor deficits (sense of smell altered) may persist
    - c Management
  - 3 Severe DAI – formerly called brain stem injury, involves severe mechanical disruption of many axons in both cerebral hemispheres and extending to the brainstem
    - a Epidemiology
    - b Assessment – unconsciousness for prolonged period, posturing common, other signs of increased ICP occur depending on various degrees of damage
    - c Management
  - 4 Focal injury
    - a Skull fracture – the significance is in the amount of force involved
      - i Epidemiology
      - ii Types
        - a) Linear (80% of all skull fractures)
        - b) Depressed
        - c) Basilar
        - d) Open skull fractures
      - iii Assessment – linear fractures may be missed, depressed and open skull fractures usually found on palpation of head, use balls of fingers to palpate
        - a) Airway patency and breathing adequacy a priority
        - b) Vomiting and inadequate respirations are common
        - c) Assess for signs and symptoms of increased intracranial pressure
    - iv Management

- b Cerebral contusion – a focal brain injury in which brain tissue is bruised and damaged in a local area; may occur at both the area of direct impact (coup) and/or on the opposite side (contrecoup) of impact
  - i Epidemiology
  - ii Assessment
    - a) Airway patency and breathing adequacy a priority
    - b) Alteration in level of consciousness
    - c) May complain of progressive headache and/ or photophobia
    - d) May be unable to lay down memory – repetitive phrases common
    - e) Assess for signs and symptoms of increased intracranial pressure
  - iii Management
- c Intracranial hemorrhage
  - i Types
    - a) Epidural
    - b) Subdural
    - c) Intracerebral
    - d) Subarachnoid
  - ii Epidemiology
  - iii Assessment
    - a) May be impossible to tell which type of hematoma is present
    - b) More important to recognize the presence of brain injury
    - c) Signs/ symptoms of increasing intracranial pressure
    - d) Signs/ symptoms of neurological deficit
    - e) Early signs and symptoms of alterations in level of consciousness
    - f) Signs of brain irritation – change in personality, irritability, lethargy, confusion, repeating words or phrases, changes in consciousness, paralysis of one side of the body, seizures
    - g) GCS
  - iv Management

**IV Spinal trauma**

- A Introduction
- B Incidences
- C Morbidity and mortality
- D Traditional spinal assessments/ criteria
  - 1 Based upon mechanism of injury (MOI)
  - 2 Past emphasis for spinal immobilization considerations
    - a Unconscious accident victims
    - b Conscious accident victims checked for SCI prior to movement
    - c Any patient with a “motion” injury

- 3 Lack of clear clinical guidelines or specific criteria to evaluate for SCI
- 4 Signs which may indicate SCI
  - a Pain
  - b Tenderness
  - c Painful movement
  - d Deformity
  - e Cuts/ bruises (over spinal area)
  - f Paralysis
  - g Paresthesias
  - h Paresis (weakness)
  - i Shock
  - j Priapism
- 5 Not always practical to immobilize every “motion” injury
- 6 Most suspected injuries were moved to a normal anatomical position
  - a Lying flat on a spine board
  - b No exclusion criteria used for moving patients to an anatomical position
- 7 Need to have clear criteria to assess for the presence of SCI
- E General spinal anatomy and physiology review
- F General assessment of spinal injuries
  - 1 Determine mechanism of injury/ nature or injury
    - a Positive MOI
      - i Always requires full spinal immobilization
        - a) High speed motor vehicle crash(es)
        - b) Falls greater than three times patient’s height
        - c) Violent situations occurring near the spine
        - d) Sports injuries
        - e) Other high impact situations
      - ii Some medical directors may allow field personnel to not immobilize patients with MOI but without signs and/ or symptoms of a SCI
        - a) Based on assessment
    - b Negative MOI
      - i Forces or impact involved does not suggest a potential spinal injury
      - ii Does not require spinal immobilization
        - a) Examples
    - c Uncertain MOI
      - i Unclear or uncertainty regarding the impact or forces
      - ii Clinical criteria used for a basis of whether to employ spinal immobilization
        - a) Examples
    - d Clinical criteria versus mechanism of injury
      - i Initial management
        - a) Based solely upon MOI
      - ii Positive MOI
        - a) Spine immobilization
      - iii Negative MOI
        - a) Without signs or symptoms

- iv Uncertain MOI
  - a) Need for further clinical assessment and evaluation
- v In some non-traumatic spinal conditions immobilization may be necessary/indicated
- vi Altered LOC or unconsciousness requires spine stabilization
- G Assessment of uncertain MOIs
  - 1 Specific clinical criteria
    - a Necessary to assess when electing not to immobilize a trauma patient
    - b Begins with patient reliability
      - i Continually reassessed during specific exam
    - c If specific criteria cannot be clearly satisfied; complete spine immobilization undertaken
    - d Positive MOI always equals spine immobilization
      - i This specific assessment may still be used to determine level of injury
  - 2 Specific criteria
    - a Prevent motion of the spine by assistant maintaining stabilization throughout the exam
    - b Reliable patients/ exam
      - i In order for assessments of pain, tenderness, motor, and sensory function to be accurate the patient must be reliable
      - ii Patient must be
        - a) Calm
        - b) Cooperative
        - c) Sober
        - d) Alert and oriented
      - iii Unreliable patient defined
        - a) Acute stress reaction
        - b) Brain injury
        - c) Intoxication
        - d) Abnormal mental status
        - e) Distracting injuries
        - f) Communication problems
      - iv Unreliable indicators present
        - a) Full spinal immobilization indicated
    - c Assess for spinal pain
      - i Patient is asked about
        - a) Any related spinal pain
        - b) Signs
        - c) Symptoms
      - ii May be poorly localized
      - iii Might not feel directly over the spinous process
      - iv Pain with active movement of head and neck
        - a) Patient is asked to slowly move their head and neck
        - b) If any pain occurs
    - d Assess for spine tenderness
      - i Palpate over each of the spinous processes of the vertebra
      - ii Begin at the neck and work towards the pelvis

- iii May be beneficial to palpate back up from the pelvis to the neck
  - e Upper extremity neurological function assessment
    - i Motor function
      - a) Finger abduction/ adduction
      - b) Finger/ hand extension
    - ii Sensory function
      - a) Pain sensation
  - f Lower extremity neurological function assessment
    - i Motor function
      - a) Foot plantar flexion
      - b) Foot/ great toe dorsiflexion
    - ii Sensory function
      - a) Pain sensation
  - g General motor function assessment
    - i Tests nerve roots at both cervical and lumbar/sacral spine levels
    - ii Check two sets of nerve roots at each level as well as left and right sides
    - iii Able to determine most clinical patterns of SCI
    - iv Motor exams can to be completed even if local injury exists
      - a) If exam cannot be completed due to local injury entire exam is unreliable
  - h Sensory function assessment
    - i Test (exam) sensory
      - a) At cervical and lumbar/ sacral spine levels
    - ii Sensory exam will detect clinical patterns of SCI
    - iii Any signs or symptoms of abnormal sensation
      - a) Spinal immobilization indicated
- H General management of spinal injuries
  - 1 Principles of spinal immobilization
    - a Primary goal is to prevent further injury
    - b Treat spine as a long bone with a joint at either end (head and pelvis)
    - c 15% of secondary spinal injuries are preventable with proper immobilization
    - d Always use “complete” spine immobilization
      - i Impossible to isolate and splint specific injury site
    - e Spine stabilization begins in the initial assessment
      - i Continues until the spine is completely immobilized on a long backboard
    - f Head and neck should be placed in a neutral, in-line position unless contraindicated
      - i Neutral positioning allows for the most space for the cord
        - a) Reducing cord hypoxia
        - b) Reducing excess pressure
      - ii Most stable position for the spinal column
        - a) Reduces instability

- 2 Spinal stabilization/ immobilization
    - a Systematic approach
      - i Cervical immobilization
        - a) Manual
        - b) Rigid collar
      - ii Interim immobilization device
        - a) When indicated (vest type mobilization device, short backboard)
        - b) Movement of a stable patient from a seated position to a long backboard
      - iii Long backboard
      - iv Full body vacuum splints
      - v Padding (body shims)
        - a) Use to maintain anatomical position
        - b) Limits movement of patient
        - c) Fill all voids
        - d) Pillows
        - e) Towels
        - f) Blankets
      - vi Straps
        - a) Sufficient to immobilize to the long backboard
      - vii Cervical immobilization device
        - a) Commercial
        - b) Tape
        - c) Blanket roll
        - d) Pillows
    - b Helmeted patients
      - i Special assessment needs for patients wearing helmets
      - ii Indications for leaving the helmet in place
      - iii Indications for helmet removal
      - iv Types of helmets
      - v General guidelines for helmet removal
- V Thoracic trauma
- A General Introduction
    - 1 Epidemiology
    - 2 Mechanism of injury
    - 3 Anatomy and physiology review of the thorax
    - 4 Pathophysiology
    - 5 Assessment findings
    - 6 Management
      - a Airway and ventilation
        - i Oxygen therapy
        - ii Endotracheal intubation
        - iii Needle cricothyrotomy
        - iv Surgical cricothyrotomy
        - v Positive pressure ventilation
        - vi Occlude open wounds
        - vii Stabilize chest wall

- b Circulation
    - i Manage cardiac dysrhythmias
    - ii Intravenous access
  - c Pharmacologic
    - i Analgesics
    - ii Antiarrhythmics
  - d Non-pharmacologic
    - i Needle thoracostomy
    - ii Tube thoracostomy – in hospital management
    - iii Pericardiocentesis – in hospital management
  - e Transport considerations
    - i Appropriate mode
    - ii Appropriate facility
- B Chest wall injuries
- 1 Rib fractures
    - a Epidemiology
    - b Anatomy and physiology review
    - c Pathophysiology
    - d Assessment findings
    - e Management
      - i Airway and ventilation
        - a) Oxygen therapy
        - b) Positive pressure ventilation
        - c) Encourage coughing and deep breathing
      - ii Pharmacological
        - a) Analgesics
      - iii Non-pharmacological
        - a) Splint – but avoid circumferential splinting
      - iv Transport consideration
        - a) Appropriate mode
        - b) Appropriate facility
      - v Psychological support/ communication strategies
  - 2 Flail segment
    - a Epidemiology
    - b Pathophysiology
    - c Assessment findings
    - d Management
      - i Airway and ventilation
        - a) Positive pressure ventilation may be needed
        - b) Oxygen (high concentration)
        - c) Evaluate the need for endotracheal intubation
        - d) Stabilize flail segment (may be controversial locally)
        - e) Positive end expiratory pressure (PEEP)
      - ii Circulation
        - a) Restrict fluids
      - iii Pharmacologic
        - a) Analgesics

- iv Non-pharmacologic
          - a) Positioning
          - b) Endotracheal intubation and positive pressure ventilation for internal splinting effect
        - v Transport considerations
          - a) Appropriate mode
          - b) Appropriate facility
        - vi Psychological support/ communication strategies
  - 3 Sternal fracture
    - a Epidemiology
    - b Pathophysiology
    - c Assessment findings
    - d Management
      - i Airway and ventilation
      - ii Circulation
        - a) Restrict fluids if pulmonary contusion is suspected
      - iii Pharmacologic
        - a) Analgesics
      - iv Non-pharmacologic
        - a) Allow chest wall self-splinting
      - v Transport considerations
        - a) Appropriate mode
        - b) Appropriate facility
      - vi Psychological support/ communication strategies
- C Injury to the lung
  - 1 Simple pneumothorax
    - a Epidemiology
    - b Pathophysiology
    - c Assessment findings
    - d Management
      - i Airway and ventilation
        - a) Positive pressure ventilation if necessary
        - b) Monitor for development of tension pneumothorax
      - ii Non-pharmacologic
        - a) Needle thoracostomy
      - iii Transport consideration
        - a) Appropriate mode
        - b) Appropriate facility
    - e Psychological support/ communication strategies
  - 2 Open pneumothorax
    - a Epidemiology
    - b Pathophysiology
    - c Assessment findings
    - d Management
      - i Airway and ventilation
        - a) Positive pressure ventilation if necessary
        - b) Monitor for development of tension pneumothorax

- ii Non-pharmacologic
  - a) Occlude open wound
  - b) Tube thoracostomy – in hospital management
- e Transport consideration
  - i Appropriate mode
  - ii Appropriate facility
- f Psychological support/ communication strategies
- 3 Tension pneumothorax
  - a Epidemiology
  - b Pathophysiology
  - c Assessment findings
  - d Management
    - i Airway and ventilation
      - a) Positive pressure ventilation if necessary
    - ii Circulation
      - a) Relieve tension pneumothorax to improve cardiac output
    - iii Non-pharmacologic
      - a) Occlude open wound
      - b) Needle thoracentesis
      - c) Tube thoracostomy – in hospital management
    - iv Transport consideration
      - a) Appropriate mode
      - b) Appropriate facility
    - v Psychological support/ communication strategies
- 4 Hemothorax
  - a Epidemiology
  - b Pathophysiology
  - c Assessment findings
  - d Management
    - i Airway and ventilation
      - a) Positive pressure ventilation if necessary
    - ii Circulation
      - a) Re-expand the affected lung to reduce bleeding
    - iii Non-pharmacological
      - a) Needle chest decompression
      - b) Tube thoracostomy – in hospital management
    - iv Transport considerations
      - a) Appropriate mode
      - b) Appropriate facility
    - v Psychological support/ communication strategies
- 5 Hemopneumothorax
  - a Epidemiology
  - b Pathophysiology
  - c Assessment findings
  - d Management
    - i Management is the same as a hemothorax

- 6 Pulmonary contusion
    - a Epidemiology
    - b Pathophysiology
    - c Assessment findings
    - d Management
      - i Airway and ventilation
        - a) Positive pressure ventilation if necessary
      - ii Circulation
        - a) Restrict intravenous fluids (use caution restricting fluids in hypovolemic patients)
      - iii Transport considerations
        - a) Appropriate mode
        - b) Appropriate facility
      - iv Psychological support/ communication strategies
- D Myocardial injuries
  - 1 Pericardial tamponade
    - a Epidemiology
    - b Anatomy and physiology
    - c Pathophysiology
    - d Assessment findings
    - e Management
      - i Airway and ventilation
      - ii Circulation
        - a) Fluid challenge
      - iii Non-pharmacological
        - a) Pericardiocentesis – in hospital management
      - iv Transport considerations
        - a) Appropriate mode
        - b) Appropriate facility
      - v Psychological support/ communication strategies
  - 2 Myocardial contusion (blunt myocardial injury)
    - a Epidemiology
    - b Anatomy and physiology
    - c Pathophysiology
    - d Assessment findings
    - e Management
      - i Airway and ventilation
        - a) Oxygen therapy
      - ii Circulation
        - a) Intravenous fluid volume
      - iii Pharmacological
        - a) Antiarrhythmics
        - b) Vasopressors
      - iv Transport considerations
        - a) Appropriate mode
        - b) Appropriate facility
      - v Psychological support/ communication strategies

- 3 Myocardial rupture
  - a Epidemiology
  - b Anatomy and physiology
  - c Pathophysiology
  - d Assessment findings
  - e Management is supportive
- E Vascular injuries
  - 1 Aortic dissection/ rupture
    - a Epidemiology
    - b Anatomy and physiology
    - c Pathophysiology
    - d Assessment findings
    - e Management
      - i Airway and ventilation
      - ii Circulation
        - a) Do not over hydrate
      - iii Transport considerations
        - a) Appropriate mode
        - b) Appropriate facility
      - iv Psychological support/ communication strategies
  - 2 Penetrating wounds of the great vessels
    - a Epidemiology
    - b Anatomy and physiology
    - c Pathophysiology
    - d Assessment findings
    - e Management
      - i Manage hypovolemia
        - a) PASG not recommended
      - ii Relief of tamponade if present
      - iii Expeditious transport
- F Other thorax injuries
  - 1 Diaphragmatic injury
    - a Epidemiology
    - b Pathophysiology
    - c Assessment
    - d Management
      - i Airway and ventilation
        - a) Positive pressure ventilation if necessary
        - b) Caution IPPB may worsen the injury
      - ii Non-pharmacologic
        - a) Do not place patient in Trendelenburg position
      - iii Transport consideration
        - a) Appropriate mode
        - b) Appropriate facility
      - iv Psychological support/ communication strategies
  - 2 Esophageal injury
    - a Epidemiology
    - b Pathophysiology
    - c Assessment

- d Management
  - i Airway and ventilation
  - ii Transport consideration
    - a) Appropriate mode
    - b) Appropriate facility
  - iii Psychological support/ communication strategies
- 3 Tracheo-bronchial injuries
  - a Epidemiology
  - b Pathophysiology
  - c Assessment
  - d Management
    - i Airway and ventilation
    - ii Circulation
    - iii Transport consideration
      - a) Appropriate mode
      - b) Appropriate facility
- 4 Traumatic asphyxia
  - a Epidemiology
  - b Pathophysiology
  - c Assessment
  - d Management
    - i Airway and ventilation
    - ii Circulation
      - a) Expect hypotension once compression is released
    - iii Pharmacological
      - a) Sodium bicarbonate should be guided by ABGs in hospital
    - iv Transport considerations
      - a) Appropriate mode
      - b) Appropriate facility

**VI Abdominal trauma**

- A General introduction
  - 1 Epidemiology
  - 2 Anatomy review
  - 3 Mechanism of injury review
- B General system pathophysiology, assessment, and management
  - 1 Pathophysiology of abdominal injuries
  - 2 Assessment
  - 3 Management/ treatment plan
    - a Surgical intervention only effective therapy
    - b No definitive therapy possible out-of-hospital
    - c Rapid evaluation
    - d Initiation of shock resuscitation
    - e Rapid packaging and transport to nearest appropriate facility
      - i Facility must have immediate surgical capability
      - ii Rapid transport
        - a) Defeated if hospital cannot provide immediate surgical intervention

- iii Crystalloid fluid replacement
    - a) En route to hospital
  - iv Airway support
  - v Breathing support
  - vi Circulatory support
    - a) Control obvious hemorrhage
    - b) Tamponade bleeding
    - c) Manage hypotension
  - vii Patient packaging
  - viii Transport
    - a) Indications for rapid transport
    - b) Indications for transport to trauma center
    - c) Indications for transport to acute care facility
    - d) Indications for no transport required
- C Specific injuries
- 1 Solid organ injuries
    - a Overview
      - i Epidemiology
      - ii Prevention strategies
      - iii Anatomy and physiology review
      - iv Pathophysiology
      - v Assessment
      - vi Management/ treatment plan
        - a) Airway support
        - b) Breathing support
        - c) Circulatory support
        - d) Patient packaging
        - e) Transport
        - f) Psychological support/ communications strategies
    - b Liver injuries
      - i Morbidity and mortality
        - a) Result of blood loss
      - ii Injuries result of
        - a) Blunt trauma
        - b) Penetrating trauma
    - c Splenic injuries
      - i Most frequently injured organ
        - a) Blunt trauma
        - b) Commonly associated with other intra abdominal injuries
        - c) May present with left shoulder pain
    - d Kidney injuries
      - i Often presents with hematuria
      - ii Back pain
    - e Pancreas
      - i Most common with penetrating injuries

- ii May also occur as a result of pancreas being compressed against vertebral column by
        - a) Steering wheels
        - b) Handle bars
        - c) Other structures stronger than the pancreas
      - iii Products of pancreas have an irritation effect on peritoneum
      - iv Auto-digestion of tissue
    - f Diaphragm
      - i Injury often insidious
      - ii Herniation of abdominal contents into chest may occur
- 2 Hollow organ injuries
  - a Overview
    - i Epidemiology
    - ii Prevention strategies
    - iii Anatomy and physiology review
    - iv Pathophysiology
    - v Assessment
    - vi Management/ treatment plan
      - a) Airway support
      - b) Breathing support
      - c) Circulatory support
      - d) Patient packaging
      - e) Transport
      - f) Psychological support/ communications strategies
  - b Small and large intestines
    - i Most often injured as a result of penetrating injuries
    - ii Can occur with deceleration injuries
  - c Stomach
    - i Most often injured as a result of
      - a) Blunt trauma
      - b) Full stomach prior to incident increases risk of injury
  - d Duodenum
    - i Most often injured as a result of
      - a) Blunt trauma
    - ii Recognition often delayed
  - e Bladder
    - i Most often injured as a result of
      - a) Blunt trauma
      - b) Full bladder prior to incident may increase risk of injury
    - ii Associated with pelvic injury
- 3 Abdominal vascular injuries
  - a Overview
    - i Epidemiology
    - ii Prevention strategies
    - iii Anatomy and physiology review
    - iv Pathophysiology
    - v Assessment

- vi Management/ treatment plan
  - a) Airway support
  - b) Breathing support
  - c) Circulatory support
  - d) Patient packaging
  - e) Transport
  - f) Psychological support/ communications strategies
- 4 Other related abdominal injuries
  - a Eviscerations
    - i Epidemiology
    - ii Prevention strategies
    - iii Anatomy and physiology review
    - iv Pathophysiology
    - v Assessment
    - vi Management/ treatment plan
      - a) Airway support
      - b) Breathing support
      - c) Circulatory support
      - d) Patient packaging
      - e) Transport
      - f) Psychological support

# **Module V: Pediatrics**

**NREMT PRACTICE ANALYSIS TASK ITEMS**

- Assess an infant or child w/ cardiac arrest
- Provide care to an infant or child w/ cardiac arrest
- Assess an infant or child w/ respiratory distress
- Provide care to an infant or child in respiratory distress
- Assess an infant or child with shock (hypoperfusion)
- Provide care to an infant or child with shock (hypoperfusion)
- Assess an infant or child with trauma
- Provide care to an infant or child with trauma

**COGNITIVE OBJECTIVES**

At the completion of this unit, the paramedic will be able to:

- 5.1 Describe techniques for successful assessment of infants and children. (C-1) / 6-2.8
- 5.2 Describe techniques for successful treatment of infants and children. (C-1) / 6-2.9
- 5.3 Discuss the appropriate equipment utilized to obtain pediatric vital signs. (C-1) / 6-2.14
- 5.4 Determine appropriate airway adjuncts for infants and children. (C-1) 6-2.15
- 5.5 Discuss complications of improper utilization of airway adjuncts with infants and children. (C-1) 6-2.16
- 5.6 Discuss appropriate ventilation devices for infants and children. (C-1) 6-2.17
- 5.7 Discuss complications of improper utilization of ventilation devices with infants & children. (C-1) 6-2.18
- 5.8 Discuss appropriate endotracheal intubation equipment for infants and children. (C-1) / 6-2.19
- 5.9 Identify complications of improper endotracheal intubation procedure in infants and children. (C-1) / 6-2.20
- 5.10 List the indications and methods for gastric decompression for infants and children. (C-1) / 6-2.21
- 5.11 Differentiate between upper airway obstruction and lower airway disease. (C-3) / 6-2.25
- 5.12 Describe the general approach to the treatment of children with respiratory distress, failure, or arrest from upper airway obstruction or lower airway disease. (C-3) / 6-2.26
- 5.13 Discuss the common causes of hypoperfusion in infants and children. (C-1) / 6-2.27
- 5.14 Evaluate the severity of hypoperfusion in infants and children. (C-3) / 6-2.28
- 5.15 Identify the major classifications of pediatric cardiac rhythms. (C-1) 6-2.29
- 5.16 Discuss the primary etiologies of cardiopulmonary arrest in infants and children. (C-1) / 6-2.30
- 5.17 Discuss age appropriate vascular access sites for infants and children. (C-1) 6-2.31
- 5.18 Discuss the appropriate equipment for vascular access in infants and children. (C-1) 6-2.32
- 5.19 Identify complications of vascular access for infants and children. (C-1) 6-2.33
- 5.20 Describe the primary etiologies of altered level of consciousness in infants and children. (C-1) 6-2.34
- 5.21 Identify common lethal mechanisms of injury in infants and children. (C-1) / 6-2.35
- 5.22 Discuss anatomical features of children that predispose or protect them from certain injuries. (C-1) / 6-2.36
- 5.23 Describe aspects of infant and children airway management that are affected by potential cervical spine injury. (C-1) / 6-2.37
- 5.24 Identify infant and child trauma patients who require spinal immobilization. (C-1) / 6-2.38

- 5.25 Discuss fluid management and shock treatment for infant and child trauma patient. (C-1) / 6-2.39
- 5.26 Discuss the parent/ caregiver responses to the death of an infant or child. (C-1) / 6-2.44
- 5.27 Discuss basic cardiac life support (CPR) guidelines for infants and children. (C-1) / 6-2.47
- 5.28 Identify appropriate parameters for performing infant and child CPR. (C-1) / 6-2.48
- 5.29 Integrate advanced life support skills with basic cardiac life support for infants and children. (C-3) / 6-2.49
- 5.30 Discuss the indications, dosage, route of administration and special considerations for medication administration in infants and children. (C-1) / 6-2.50
- 5.31 Discuss appropriate transport guidelines for infants and children. (C-1) / 6-2.51
- 5.32 Discuss appropriate receiving facilities for low and high risk infants and children. (C-1) / 6-2.52
- 5.33 Describe the epidemiology, including the incidence, morbidity/ mortality, risk factors and prevention strategies for respiratory distress/ failure in infants and children. (C-1) / 6-2.53
- 5.34 Discuss the pathophysiology of respiratory distress/ failure in infants and children. (C-1) / 6-2.53
- 5.35 Discuss the assessment findings associated with respiratory distress/ failure in infants and children. (C-1) / 6-2.55
- 5.36 Discuss the management/ treatment plan for respiratory distress/ failure in infants and children. (C-1) / 6-2.56
- 5.37 Describe the epidemiology, including the incidence, morbidity/ mortality, risk factors and prevention strategies for hypoperfusion in infants and children. (C-1) / 6-2.57
- 5.38 Discuss the pathophysiology of hypoperfusion in infants and children. (C-1) / 6-2.58
- 5.39 Discuss the assessment findings associated with hypoperfusion in infants and children. (C-1) / 6-2.59
- 5.40 Discuss the management/ treatment plan for hypoperfusion in infants and children. (C-1) / 6-2.60
- 5.41 Discuss the assessment findings associated with cardiac dysrhythmias in infants and children. (C-1) / 6-2.63
- 5.42 Discuss the management/ treatment plan for cardiac dysrhythmias in infants and children. (C-1) / 6-2.64
- 5.43 Describe the epidemiology, including the incidence, morbidity/ mortality, risk factors and prevention strategies for trauma in infants and children. (C-1) / 6-2.69
- 5.44 Discuss the pathophysiology of trauma in infants and children. (C-1) / 6-2.70
- 5.45 Discuss the assessment findings associated with trauma in infants and children. (C-1) / 6-2.71
- 5.46 Discuss the management/ treatment plan for trauma in infants and children. (C-1) / 6-2.72

**PSYCHOMOTOR OBJECTIVES**

At the completion of this unit, the paramedic will be able to:

- 5.47 Demonstrate the appropriate approach for treating infants and children. (P-2) / 6-2.91
- 5.48 Demonstrate appropriate intervention techniques with families of acutely ill or injured infants and children. (P-2) / 6-2.92
- 5.49 Demonstrate an appropriate assessment for different developmental age groups. (P-2) / 6-2.93
- 5.50 Demonstrate an appropriate technique for measuring pediatric vital signs. (P-2) / 6-2.93
- 5.51 Demonstrate the use of a length-based resuscitation device for determining equipment sizes, drug doses and other pertinent information for a pediatric patient. (P-2) / 6-2.95

- 5.52 Demonstrate the appropriate approach for treating infants and children with respiratory distress, failure, and arrest. (P-2) / 6-2.96
- 5.53 Demonstrate proper technique for administering blow-by oxygen to infants and children. (P-2) / 6-2.97
- 5.54 Demonstrate the proper utilization of a pediatric non-rebreather oxygen mask. (P-2) / 6-2.98
- 5.55 Demonstrate proper technique for suctioning of infants and children. (P-2) / 6-2.99
- 5.56 Demonstrate appropriate use of airway adjuncts with infants and children. (P-2) / 6-2.100
- 5.57 Demonstrate appropriate use of ventilation devices for infants and children. (P-2) / 6-2.101
- 5.58 Demonstrate endotracheal intubation procedures in infants and children. (P-2) / 6-2.102
- 5.59 Demonstrate appropriate treatment/ management of intubation complications for infants and children. (P-2) / 6-2.103
- 5.60 Demonstrate appropriate needle cricothyroidotomy in infants and children. (P-2) / 6-2.104
- 5.61 Demonstrate proper placement of a gastric tube in infants and children. (P-2) / 6-2.105
- 5.62 Demonstrate an appropriate technique for insertion of peripheral intravenous catheters for infants and children. (P-2) / 6-2.106
- 5.63 Demonstrate an appropriate technique for administration of intramuscular, inhalation, subcutaneous, rectal, endotracheal and oral medication for infants and children. (P-2) / 6-2.106
- 5.64 Demonstrate an appropriate technique for insertion of an intraosseous line for infants and children. (P-2) / 6-2.108
- 5.65 Demonstrate appropriate interventions for infants and children with a partially obstructed airway. (P-2) / 6-2.109
- 5.66 Demonstrate age appropriate basic airway clearing maneuvers for infants and children with a completely obstructed airway. (P-2) / 6-2.110
- 5.67 Demonstrate proper technique for direct laryngoscopy and foreign body retrieval in infants and children with a completely obstructed airway. (P-2) / 6-2.111
- 5.68 Demonstrate appropriate airway and breathing control maneuvers for infant and child trauma patients. (P-2) /
- 5.69 Demonstrate appropriate treatment of infants and children requiring advanced airway and breathing control. (P-2) / 6-2.113
- 5.70 Demonstrate appropriate immobilization techniques for infant and child trauma patients. (P-2) / 6-2.114
- 5.71 Demonstrate treatment of infants and children with head injuries. (P-2) / 6-2.115
- 5.72 Demonstrate appropriate treatment of infants and children with chest injuries. (P-2) / 6-2.116
- 5.73 Demonstrate appropriate treatment of infants and children with abdominal injuries. (P-2) / 6-2.117
- 5.74 Demonstrate appropriate treatment of infants and children with extremity injuries. (P-2) / 6-2.118
- 5.75 Demonstrate appropriate treatment of infants and children with burns. (P-2) / 6-2.119
- 5.76 Demonstrate appropriate parent/ caregiver interviewing techniques for infant and child death situations. (P-2) / 6-2.120
- 5.77 Demonstrate proper infant CPR. (P-2) / 6-2.121
- 5.78 Demonstrate proper child CPR. (P-2) / 6-2.122
- 5.79 Demonstrate proper techniques for performing infant and child defibrillation and synchronized cardioversion. (P-2) / 6-2.123

## DECLARATIVE

- I Assessment
  - A General considerations
    - 1 Many components of the initial patient evaluation can be done by observing the patient. Utilize the parent/ guardian to assist in making the infant or child more comfortable as appropriate.
    - 2 Interacting with parents and family
      - a Normal responses to acute illness and injury
      - b Parent/ guardian and child interaction
      - c Intervention techniques
  - B Physical exam
    - 1 Scene survey
      - a Observe the scene for hazards or potential hazards
      - b Observe the scene for mechanism of injury/ illness
        - i Ingestion
          - a) pills, medicine bottles, household chemicals, etc.
        - ii Child abuse
          - a) Injury and history do not coincide, bruises not where they should be for mechanism of injury, etc.
        - iii Position patient found
      - c Observe the parent/ guardian/ caregiver interaction with the child
        - i Do they act appropriately
        - ii Is parent/ guardian/ caregiver concerned
        - iii Is parent/ guardian/ caregiver angry
        - iv Is parent/ guardian/ caregiver indifferent
    - 2 Initial assessment
      - a General impression
        - i General impression of environment
        - ii General impression of parent/ guardian and child interaction
        - iii General impression of the patient/ Pediatric Assessment Triangle
          - a) A structure for assessing the pediatric patient
          - b) Focuses on the most valuable information for pediatric patients
          - c) Used to ascertain if any life-threatening condition exists
          - d) Components
            - i) Appearance
            - ii) Work of breathing
            - iii) Circulation
        - iv Initial triage decisions
          - a) Urgent – proceed with rapid ABC assessment, treatment and transport
          - b) Non urgent – proceed with focused history, detailed physical exam after initial assessment
      - b Vital functions
        - i Determine level of consciousness

- a) AVPU scale
          - i) Alert
          - ii) Responds to verbal stimuli
          - iii) Responds to painful stimuli
          - iv) Unresponsive
        - b) Modified Glasgow Coma Scale
        - c) Signs of inadequate oxygenation
      - ii Airway
        - a) Determine patency
      - iii Breathing
        - a) Adequate chest rise and fall
        - b) Use of accessory muscles
        - c) Nasal flaring
        - d) Tachypnea
        - e) Bradypnea
        - f) Irregular breathing pattern
        - g) Head bobbing
        - h) Grunting
        - i) Absent breath sounds
        - j) Abnormal sounds
      - iv Circulation
        - a) Pulse
          - i) Central
          - ii) Peripheral
          - iii) Quality of pulse
        - b) Blood pressure
          - i) Measuring blood pressure is not necessary in children < 3 years of age
        - c) Skin color
        - d) Active hemorrhage
      - v Vital signs
        - a) Infant
        - b) Toddler
        - c) Preschool
        - d) School aged
        - e) Adolescent
- 3 Transition phase – Utilized to allow the infant or child to become familiar with you and your equipment
- a Use of transition phase depends on the seriousness of the patient's condition
  - b For the conscious, non-acutely ill child
  - c For the unconscious, acutely ill child do not perform the transition phase but proceed directly to the treatment and transport
- 4 Focused history
- a Approach
    - i For infant, toddler, and preschool age patient, obtain from parent/guardian
    - ii For school age and adolescent patient, most information may be obtained from the patient

- iii For older adolescent patient question the patient in private regarding sexual activity, pregnancy, illicit drug and alcohol use
    - b Content
      - i Chief complaint
        - a) Nature of illness/injury
        - b) How long has the patient been sick/injured
        - c) Presence of fever
        - d) Effects on behavior
        - e) Bowel/ urine habits
        - f) Vomiting/ diarrhea
        - g) Frequency of urination
      - ii Past medical history
        - a) Infant or child under the care of a physician
        - b) Chronic illnesses
        - c) Medications
        - d) Allergies
  - 5 Detailed physical exam
    - a Examine all body regions
      - i Head-to-toe in older child
      - ii Toe-to-head in younger child
    - b Some or all of the following may be appropriate, depending on the situation
      - i Pupils
      - ii Capillary refill
        - a) Normal – two seconds or less
        - b) Valuable to assess on patients less than six years of age
        - c) Less reliable in cold environment
        - d) Blanch nailbed, base of the thumb, sole of the feet
      - iii Hydration
        - a) Skin turgor
        - b) Sunken or flat fontanelle in an infant
        - c) Presence of tears and saliva
      - iv Pulse oximetry
        - a) Should be utilized on any moderately injured or ill infant or child
        - b) Hypothermia and shock can alter reading
      - v Cardiac monitor
  - 6 On-going exam – continually monitor the following
    - a Respiratory effort
    - b Color
    - c Mental status
    - d Pulse oximetry
    - e Vital signs
    - f Patient temperature
- C General management**
- 1 Airway management in pediatric patients
    - a Basic airway management

- i Manual positioning
  - a) Allow medical patients to assume position of comfort
  - b) Support under the torso for trauma patients less than 3 year old
  - c) Occipital elevation for supine medical patients 3 years of age or older
- ii Foreign body airway obstruction – basic clearing methods
  - a) Infants
    - i) Back blows
    - ii) Chest thrusts
  - b) Children
    - i) Abdominal thrusts
- iii Suction
  - a) Avoid hypoxia
  - b) Avoid upper airway stimulation
  - c) Decrease suction negative pressure (100 mm/Hg) in infants
- iv Oxygenation
  - a) Non-rebreather mask
  - b) Blow-by oxygen if mask is not tolerated
    - i) Utilize the parent or guardian to deliver oxygen if (patient condition warrants
  - c) Maintain proper head position
- v Oropharyngeal airway
  - a) Sizing
  - b) Preferred method of insertion uses the tongue blade to depress the tongue and jaw
- vi Nasopharyngeal airway
  - a) Sizing
  - b) No major differences in sizing or use compared to adults
- vii Ventilation
  - a) Bag size
  - b) Proper mask fit
  - c) Proper mask position and seal (E-C clamp)
  - d) Ventilate at age appropriate rate (squeeze-release-release)
  - e) Obtain chest rise with each breath
  - f) Allow adequate time for exhalation
  - g) Assess BVM ventilation
  - h) Apply cricoid pressure to minimize gastric inflation and passive regurgitation
- b Advanced airway management
  - i Foreign body airway obstruction – advanced clearing methods
    - a) Direct laryngoscopy with Magill forceps
    - b) Attempt intubation around foreign body
    - c) Consider needle cricothyroidotomy per medical direction only as a last resort if complete upper airway obstruction is present

- ii Endotracheal intubation in pediatric patients
      - a) Laryngoscope and appropriate size blade
        - i) Length based resuscitation tape to determine size
        - ii) Straight blade is preferred
      - b) Appropriate size endotracheal tube and stylet
        - i) Sizing methods
          - a. Length based resuscitation tape
        - ii) Stylet placement
      - c) Technique for pediatric intubation
      - d) Depth of insertion
      - e) Endotracheal tube securing device
    - iii Needle cricothyroidotomy in pediatric patients
- 2 Circulation
  - a Vascular access
    - i Intraosseous access in children < 6 years of age in cardiac arrest or if intravenous access fails
  - b Fluid resuscitation
    - i 20 ml/kg of lactated ringer's or normal saline bolus as needed
- 3 Pharmacological
  - a Rapid sequence intubation per medical direction
- 4 Non-pharmacological
  - a C-spine immobilization for traumatic cause
- 5 Transport considerations
  - a Appropriate mode
    - i Transport should not be delayed to perform procedures that can be done en route
    - ii Proper BLS care must be performed prior to any ALS interventions
  - b Appropriate facility
    - i The availability of a receiving hospital with expertise in pediatric care may improve the patient's outcome
- 6 Psychological support/ communication strategies
  - a Utilize the parent/ guardian to assist in making the infant or child more comfortable
  - b Encourage parents to help calm the child during painful procedures
  - c Infants, toddlers, preschool and school aged patients do not like to be separated from parent/ guardian
  - d Infants and children have a natural fear of strangers; for stable patients, allow them to become accustomed to you before your hands-on assessment
  - e Give some control of what is going to happen to the patient (which arm to have their IV)
  - f When possible and practical, physically position your face at the same level as the patient's face to facilitate communication and minimize fear
  - g Use age-appropriate vocabulary
  - h Keep patient warm
  - i Allow child to take their favorite toy/ blanket if possible

- j Permit the child to express their feelings (e.g., fear, pain, crying,)
- k Let the child know that certain physical actions (e.g., hitting, biting, spitting) are not permitted

**II Specific pathophysiology, assessment and management**

**A Respiratory compromise**

**1 Introduction**

- a Epidemiology
  - i Incidence
  - ii Morbidity/ mortality
  - iii Risk factors
  - iv Prevention strategies
- b Categories of respiratory compromise
  - i Upper airway obstruction
  - ii Lower airway disease

**2 Pathophysiology**

- a Respiratory illnesses cause respiratory compromise in airway/ lung
  - i Severity of respiratory compromise depends on extent of respiratory illness
  - ii Approach to treatment depends on severity of respiratory compromise
- b Severity
  - i Respiratory distress
    - a) Increased work of breathing
    - b) Carbon dioxide tension in the blood initially decreases, then increases as condition deteriorates
    - c) If uncorrected, respiratory distress leads to respiratory failure
  - ii Respiratory failure
    - a) Inadequate ventilation or oxygenation
      - i) Respiratory and circulatory systems are unable to exchange enough oxygen and carbon dioxide
    - b) Carbon dioxide tension in the blood increases, leading to respiratory acidosis
    - c) Very ominous condition; patient is on the verge of respiratory arrest
  - iii Respiratory arrest
    - a) Cessation of breathing
    - b) Failure to intervene will result in cardiopulmonary arrest
    - c) Good outcomes can be expected with early intervention that prevents cardiopulmonary arrest
- c Assessment
  - i Chief Complaint
  - ii History
  - iii Physical findings
    - a) Signs and symptoms of respiratory distress
      - i) Normal mental status => irritability or anxiety
      - ii) Tachypnea



- v Circulation
- vi Supportive care
- vii Transport considerations
  - a) Appropriate mode
  - b) Appropriate facility
- viii Psychological support/ communication strategies
- 3 Upper airway obstruction
  - a Croup
    - i Epidemiology
      - a) Incidence
        - i) Very common in infants and children (6 months to 4 years of age)
      - b) Risk factors
      - c) Prevention strategies
    - ii Pathophysiology
      - a) An inflammatory process of the upper respiratory tract involving the subglottic region
      - b) Main cause is viral infection of the upper airway
      - c) Another form is spasmodic croup
        - i) Occurs mostly in the middle of the night
        - ii) Usually without prior upper respiratory infection
    - iii Assessment
      - a) Signs and symptoms of respiratory distress or failure, depending on severity, plus
        - i) Appears sick
        - ii) Stridor
        - iii) Barking (seal or dog-like) or brassy cough
        - iv) Hoarseness
        - v) Fever (+/-)
      - b) History
        - i) Usually with history of upper respiratory infection in classic croup (1-2 days)
        - ii) Rarely progresses to respiratory failure
    - iv Management
      - a) Airway and ventilation
        - i) Humidified or nebulized oxygen
        - ii) Cool mist oxygen at 4-6 L/min
      - b) Circulation
      - c) Pharmacological
      - d) Non-pharmacological
        - i) Keep child in position of comfort
      - e) Transport considerations
      - f) Psychological support/ communication strategies
        - i) Do not agitate the patient (no IVs, blood pressure, etc.)
        - ii) Keep the parent/ guardian/ caregiver with the infant or child if appropriate

- b Foreign body aspiration
  - i Epidemiology
    - a) Incidence
      - i) Usually occurs in toddlers and pre-schoolers (1 to 4 years of age, but can occur at any age)
      - ii) Common
    - b) Risk factors
    - c) Prevention strategies
  - ii Pathophysiology
    - a) Partial or complete blockage of the upper airway by a foreign body
    - b) Objects are usually food (hard candy, nuts, seeds, hot dog) or small objects (coins, balloons)
    - c) If no interventions or if interventions are unsuccessful, respiratory arrest followed by cardiopulmonary arrest will ensue
  - iii Assessment
    - a) Partial obstruction
      - i) Signs and symptoms of respiratory distress or failure, depending on severity, plus
      - ii) History – Usually a history of choking if observed by adult
    - b) Complete obstruction
      - i) Signs and symptoms of respiratory failure or arrest, depending on severity, plus
      - ii) History
  - iv Management
    - a) Airway and ventilation
      - i) Partial obstruction
      - ii) Complete obstruction
    - b) Circulation
    - c) Pharmacological
    - d) Transport considerations
      - i) Notify hospital of patient status
      - ii) Transport expeditiously
    - e) Psychological support/ communication strategies
      - i) Do not agitate patient
      - ii) Keep caregiver with child, if appropriate
- c Bacterial tracheitis
  - i Epidemiology
    - a) Incidence
      - i) Usually occurs in infants and toddlers (1-5 years old), but can occur in older children
      - ii) Very uncommon
    - b) Risk factors
    - c) Prevention strategies
  - ii Pathophysiology
    - a) Bacterial infection of the upper airway, subglottic trachea, usually following viral croup

- iii Assessment
  - a) Signs and symptoms – respiratory distress or failure depending on severity, plus
    - i) Appears agitated, sick
    - ii) High-grade fever
    - iii) Inspiratory and expiratory stridor
    - iv) Coughing up pus/ mucous
    - v) Hoarse voice
    - vi) Pain in throat
  - b) History
    - i) Usually a history of croup in the preceding few days
  - c) May progress to respiratory failure or arrest
- iv Management
  - a) Assure airway and ventilation
  - b) Administer oxygen by non-rebreather or blow-by
  - c) Complete obstruction or respiratory failure/ arrest
    - i) BVM ventilation
    - ii) May require high pressure to adequately ventilate
    - iii) Intubate patient
    - iv) Suction endotracheal tube to reduce pus or mucous
  - d) Circulation
  - e) Pharmacological
  - f) Transport considerations
    - i) Place patient in sitting position
    - ii) Notify hospital of patient status as early as possible
    - iii) Transport quickly
  - g) Psychological support/ communication strategies
    - i) DO NOT AGITATE THE PATIENT – no IVs, no BP, do not look in patient’s mouth
    - ii) Keep caregiver with child if appropriate
- d Epiglottitis
  - i Epidemiology
    - a) Incidence
      - i) Usually occurs in pre-school and school-age children (3-7 years of age) but can occur at any age
      - ii) Extremely uncommon due to the H. flu vaccine
    - b) Risk factors
    - c) Prevention strategies
  - ii Pathophysiology
    - a) Rapidly forming cellulitis of the epiglottis and its surrounding structures
    - b) Bacterial infection, usually Hemophilus influenza type B
    - c) Can be a true life-threatening emergency

- iii Assessment
  - a) Signs and symptoms of respiratory distress or failure depending on severity, plus
    - i) Appears agitated, sick
    - ii) Stridor
    - iii) Muffled voice
    - iv) Drooling
    - v) Sore throat
    - vi) Pain on swallowing
    - vii) High fever
  - b) History
    - i) Usually no previous history but a rapid onset of symptoms (6-8 hours)
  - c) Can quickly progress to respiratory arrest
- iv Management
  - a) Airway and ventilation
    - i) NEVER ATTEMPT TO VISUALIZE THE AIRWAY IF THE PATIENT IS AWAKE
    - ii) Allow the parent to administer oxygen
    - iii) If airway becomes obstructed, two rescuer ventilation with BVM is almost always effective
    - iv) If BVM is not effective, attempt intubation with stylet in place
    - v) Intubation should not be attempted in settings with short transport times
    - vi) Performing chest compression upon glottic visualization during intubation may produce a bubble at the tracheal opening
    - vii) Consider needle cricothyroidotomy per medical direction as a last resort if complete upper airway obstruction is present
  - b) Circulation
  - c) Pharmacological
  - d) Transport considerations
    - i) Allow patient to assume position of comfort
    - ii) Notify hospital of patient status early
    - iii) Transport to the hospital without delay, keeping child warm
  - e) Psychological support/ communication strategies
    - i) DO NOT AGITATE THE PATIENT – no IVs, BP, do not look in patient’s mouth
    - ii) Keep the caregiver with the child if appropriate
- 4 Lower airway disease
  - a) Asthma
    - i) Epidemiology
      - a) Incidence

- i) Usually occurs in children older than 2 years of age
      - ii) Very common
    - b) Risk factors
      - i) Typically in child with known history of asthma
      - ii) Triggered by upper respiratory infections, allergies, changes in temperature, physical exercise and emotional response
      - iii) Children that experience prolonged asthma attacks tire easily; watch for signs of respiratory failure
    - c) Prevention strategies
  - ii Pathophysiology
    - a) Bronchospasm
    - b) Excessive mucous production
    - c) Inflammation of the small airways
  - iii Assessment
    - a) Signs and symptoms – respiratory distress or failure depending on severity, plus
      - i) Appears anxious
      - ii) Wheezes
      - iii) Prolonged expiratory phase
      - iv) A silent chest means danger
    - b) History
      - i) Usually follows exposure to known trigger
    - c) Bronchiolitis and asthma may present very similarly
  - iv Management
    - a) Airway and ventilation
      - i) Administer oxygen by tolerated method
      - ii) BVM ventilations for respiratory failure/ arrest (progressive lethargy, poor muscle tone, shallow respiratory effort)
      - iii) Endotracheal intubation for respiratory failure/ arrest with prolonged BVM ventilations, or inadequate response to BVM ventilations
    - b) Circulation
    - c) Pharmacological
      - i) Albuterol nebulizer
      - ii) Subcutaneous epinephrine 1:1000 – only with severe respiratory distress or failure
      - iii) Medications can be repeated if no effect
    - d) Transport considerations
      - i) Allow patient to assume position of comfort
    - e) Psychological support/ communication strategies
      - i) Keep caregiver with child if appropriate
- b Bronchiolitis
  - i Epidemiology

- a) Incidence
  - i) Usually occurs in children less than 2 years of age
  - ii) Very common
- b) Risk factors
  - i) Usually occurs in winter months
- c) Prevention strategies
- ii Pathophysiology
  - a) An inflammatory process of the lower respiratory tract including the terminal airways
  - b) Main cause is respiratory syncytial virus infection of the lower airway
- iii Assessment
  - a) Signs and symptoms – respiratory distress or failure depending on severity, plus
    - i) Appears anxious
    - ii) Wheezing
    - iii) Rales (diffuse)
  - b) History
    - i) Usually a history of upper respiratory infection symptoms
  - c) Bronchiolitis and asthma may present very similarly
- iv Management
  - a) Airway and ventilation
    - i) Administer oxygen by tolerated method
    - ii) BVM ventilations for respiratory failure/ arrest (progressive lethargy, poor muscle tone, shallow respiratory effort)
    - iii) Endotracheal intubation for respiratory failure/ arrest with prolonged BVM ventilations, or inadequate response to BVM ventilations
  - b) Circulation
  - c) Pharmacological
    - i) Albuterol nebulizer
  - d) Transport considerations
    - i) Allow patient to assume position of comfort
  - e) Psychological support/ communication strategies
    - i) Keep caregiver with child if appropriate
- c Pneumonia
  - i Epidemiology
    - a) Incidence
      - i) Usually occurs in infants, toddlers and pre-schoolers (1-5 years of age), but can occur at any age
      - ii) Common
    - b) Risk factors
    - c) Prevention strategies

- ii Pathophysiology
  - a) Infection of the lower airway and lung
  - b) May be caused by bacteria or virus
- iii Assessment
  - a) Signs and symptoms – respiratory distress or failure depending on the severity, plus
    - i) Appears anxious
    - ii) Decreased breath sounds
    - iii) Rales
    - iv) Rhonchi (localized or diffuse)
    - v) Pain in the chest
    - vi) Fever
  - b) History
    - i) Usually a history of lower respiratory infectious symptoms
- iv Management
  - a) Airway and ventilation
    - i) Administer oxygen by tolerated method
    - ii) BVM ventilations for respiratory failure/ arrest (progressive lethargy, poor muscle tone, shallow respiratory effort)
    - iii) Endotracheal intubation for respiratory failure, prolonged BVM ventilations, or inadequate response to BVM ventilations
  - b) Circulation
  - c) Pharmacological
  - d) Transport considerations
    - i) Allow patient to assume position of comfort
  - e) Psychological support/ communication strategies
    - i) Keep caregiver with child if appropriate
- d Foreign body lower airway obstruction
  - i Epidemiology
    - a) Incidence
      - i) Usually occurs in toddlers and preschool age children (1-4 years of age), but can occur at any age
      - ii) Uncommon
    - b) Risk factors
    - c) Prevention strategies
  - ii Pathophysiology
    - a) Foreign body in the lower airway or lung
    - b) Objects are usually food (nuts, seeds, etc.) or small objects
  - iii Assessment
    - a) Signs and symptoms – respiratory distress of failure depending on the severity, plus
      - i) Appears anxious
      - ii) Decreased breath sounds
      - iii) Rales

- iv) Rhonchi (localized or diffuse)
        - v) Pain in the chest
      - b) History
        - i) May be a history of choking if witnessed by an adult
    - iv Management
      - a) Airway and ventilation
        - i) Administer oxygen by tolerated method
        - ii) BVM ventilations for respiratory failure/ arrest (progressive lethargy, poor muscle tone, shallow respiratory effort)
        - iii) Endotracheal intubation for respiratory failure/ arrest with prolonged BVM ventilations, or inadequate response to BVM ventilations
        - iv) Do not attempt to retrieve foreign body as it is beyond the reach of Magill forceps
      - b) Circulation
      - c) Transport considerations
        - i) Allow patient to assume position of comfort
      - d) Psychological support/ communication strategies
        - i) Keep caregiver with child if appropriate
- B Shock
  - 1 Introduction
    - a Epidemiology
      - i Incidence
      - ii Morbidity/ mortality
      - iii Risk factors
      - iv Prevention strategies
    - b Categories of shock
      - i Non-cardiogenic
      - ii Cardiogenic
  - 2 Pathophysiology
    - a An abnormal condition characterized by inadequate delivery of oxygen and metabolic substrates to meet the metabolic demands of tissues
    - b Severity
      - i Compensated (early)
        - a) Patient's blood pressure is normal although signs of inadequate tissue perfusion are present
        - b) Reversible
      - ii Decompensated (late)
        - a) Hypotension and signs of inadequate organ perfusion are present
        - b) Often irreversible
    - c Assessment
      - i Chief complaint
      - ii History
      - iii Physical findings

- a) Signs and symptoms of compensated shock
  - i) Irritability or anxiety
  - ii) Tachycardia
  - iii) Tachypnea
  - iv) Weak peripheral pulses, full central pulses
  - v) Delayed capillary refill
  - vi) Cool, pale extremities
  - vii) Systolic blood pressure within normal limits
  - viii) Decreased urinary output
- b) Signs and symptoms of decompensated shock
  - i) Lethargy or coma
  - ii) Marked tachycardia or bradycardia
  - iii) Marked tachypnea or bradypnea
  - iv) Absent peripheral pulses, weak central pulses
  - v) Markedly delayed capillary refill
  - vi) Cool, pale, dusky, mottled extremities
  - vii) Hypotension
  - viii) Markedly decreased urinary output
- d Management
  - i Graded approach to treatment
  - ii Consider separating parent and child
  - iii Airway
    - a) Trauma – immobilize c-spine
  - iv Ventilation and oxygenation
    - a) Compensated shock
      - i) Oxygen
    - b) Decompensated shock
      - i) BVM – consider ventilating patient with 100% oxygen via appropriate-sized bag
      - ii) ETT – consider intubating patient if positive pressure ventilation does not rapidly improve patient’s condition
  - v Circulation
    - a) Compensated shock
      - i) Oxygen
    - b) Decompensated shock
      - i) Non-cardiogenic
      - ii) Cardiogenic
  - vi Supportive care
  - vii Transport considerations
    - a) Appropriate mode
    - b) Appropriate facility
  - viii Psychological support/ communication strategies
- 3 Noncardiogenic
  - a Hypovolemia
    - i Epidemiology
      - a) Common

- ii Pathophysiology
  - a) Intravascular volume depletion
    - i) Severe dehydration
    - ii) Blood loss
- iii Assessment
  - a) Signs and symptoms of compensated or decompensated shock depending on severity, plus
    - i) Blood loss
    - ii) Dehydration
  - b) History
- iv Management
  - a) Airway and ventilation
    - i) Oxygen
    - ii) Trauma -- immobilize c-spine
  - b) Circulation
    - i) Compensated shock
    - ii) Decompensated shock
  - c) Supportive care
  - d) Transport considerations
  - e) Psychological support/ communication strategies
- b Distributive
  - i Epidemiology
    - a) Uncommon
  - ii Etiology
    - a) Septic
    - b) Neurogenic
    - c) Anaphylactic
  - iii Pathophysiology
    - a) Peripheral pooling due to loss of vasomotor tone
  - iv Assessment
    - a) Signs and symptoms of compensated or decompensated shock depending on severity, plus
      - i) Septic
      - ii) Neurogenic
      - iii) Anaphylactic
    - b) History
  - v Management
    - a) Airway and ventilation
      - i) Oxygen
      - ii) Trauma – immobilize c-spine
    - b) Circulation
      - i) Compensated shock
      - ii) Decompensated shock
    - c) Supportive care
    - d) Transport considerations
    - e) Psychological support/ communication strategies

- 4 Cardiogenic
  - a Cardiomyopathy
    - i Epidemiology
      - a) Infection
      - b) Congenital abnormalities
    - ii Pathophysiology
      - a) Mechanical pump failure
      - b) Usually biventricular
    - iii Assessment
      - a) Signs and symptoms of compensated or decompensated shock, depending on severity, plus
        - i) Rales
        - ii) Jugular venous distention
        - iii) Hepatomegaly
        - iv) Peripheral edema
      - b) History
    - iv Management
      - a) Airway and ventilation
        - i) Oxygen
      - b) Circulation
        - i) Compensated shock
        - ii) Decompensated shock
      - c) Supportive care
      - d) Transport considerations
      - e) Psychological support/ communication strategies
  - b Dysrhythmias
    - i Epidemiology
      - a) Bradydysrhythmias – common
      - b) Supraventricular tachydysrhythmias – uncommon
      - c) Ventricular tachydysrhythmias – very uncommon
    - ii Pathophysiology
      - a) Electrical pump failure
        - i) Results in cardiogenic shock or cardiopulmonary arrest depending on type
    - iii Assessment
      - a) Signs and symptoms of cardiogenic shock (compensated or decompensated) or cardiopulmonary arrest, depending on type
      - b) History
    - iv Management
      - a) Specific to each type
- C Dysrhythmias
  - 1 Tachydysrhythmias
    - a Supraventricular tachycardia
      - i Epidemiology
        - a) Incidence
          - i) Usually in infants with no prior history
        - b) Risk factors
        - c) Prevention strategies

- ii Pathophysiology
  - a) Stable (compensated shock) – patient will usually remain stable during transport with oxygen
  - b) Unstable (decompensated shock) – PATIENT REQUIRES IMMEDIATE TREATMENT
  - c) Children may be able to sustain increased rates for a while, but after several hours, they will decompensate
- iii Assessment
  - a) Signs and symptoms – compensated or decompensated shock, depending on severity, plus
    - i) Narrow complex tachycardia with rates of greater than 220 beats per minute (too fast to count)
    - ii) Poor feeding
    - iii) Hypotension
  - b) History
- iv Management
  - a) Stable – supportive care
  - b) Unstable
    - i) Airway and ventilation
    - ii) Circulation
    - iii) Pharmacological
    - iv) Non-pharmacological
    - v) Transport considerations
    - vi) Psychological support/ communication strategies
- b Ventricular tachycardia with a pulse
  - i Epidemiology
    - a) Incidence
    - b) Risk factors
    - c) Prevention strategies
  - ii Pathophysiology
    - a) Stable (compensated shock) – patient will usually not tolerate for long periods of time
    - b) Unstable (decompensated shock) – PATIENT REQUIRES IMMEDIATE TREATMENT
    - c) Most VT with a pulse is secondary to structural heart disease and responds poorly to lidocaine
  - iii Assessment
    - a) Signs and symptoms – signs of compensated or decompensated shock, depending on severity, plus
      - i) Rapid, wide complex tachycardia
      - ii) Poor feeding
      - iii) Hypotension
    - b) History
  - iv Management
    - a) Stable – supportive care
    - b) Unstable

- i) Airway and ventilation
    - ii) Circulation
    - iii) Pharmacological
    - iv) Non-pharmacological
    - v) Transport considerations
    - vi) Psychological support/communication strategies
  
- 2 Bradydysrhythmias
  - a Epidemiology
    - i Incidence -- most common dysrhythmia in children
    - ii Risk factors
    - iii Prevention strategies
  - b Pathophysiology
    - i Usually develops as a result of hypoxia
    - ii May develop due to vagal stimulation (rare)
  - c Assessment
    - i Signs and symptoms – compensated or decompensated shock, depending on severity, plus
      - a) Bradycardia
      - b) Slow, narrow complex heart rhythm, QRS duration may be normal or prolonged
    - ii History
  - d Management
    - i Stable – supportive care
    - ii Unstable
      - a) Airway and ventilation
        - i) Ventilate patient with 100% oxygen via BVM
        - ii) Intubate patient if poor response to BVM ventilations
      - b) Circulation
        - i) Perform chest compressions if oxygen does not increase heart rate
      - c) Pharmacological
        - i) Medications can be given down the endotracheal tube
        - ii) Administer epinephrine
        - iii) Administer atropine for vaguely induced bradycardia
      - d) Non-pharmacological
      - e) Transport considerations
      - f) Psychological support/communication strategies
  
- 3 Absent rhythm
  - a Asystole
    - i Epidemiology
      - a) Incidence – may be the initial cardiac arrest rhythm
      - b) Risk factors
      - c) Prevention strategies

- ii Pathophysiology
  - a) Bradycardias may degenerate into asystole
  - b) High mortality rate
- iii Assessment
  - a) Signs and symptoms
    - i) Pulseless
    - ii) Apneic
    - iii) Cardiac monitor indicating no electrical activity
  - b) History
- iv Management
  - a) Confirm in two leads
  - b) Airway and ventilation
    - i) Ventilate the patient with 100% oxygen via BVM
    - ii) Intubate patient if poor response to BVM ventilations
  - c) Circulation
    - i) Perform chest compressions
  - d) Pharmacological
    - i) Medications can be given down the endotracheal tube
    - ii) Administer epinephrine
  - e) Non-pharmacological
  - f) Transport considerations
  - g) Psychological support/ communication strategies
- b Ventricular fibrillation/ pulseless ventricular tachycardia
  - i Epidemiology
    - a) Incidence – rare
    - b) Risk factors
    - c) Prevention strategies
  - ii Pathophysiology
    - a) Possibly due to electrocution and drug overdoses
    - b) High mortality rate
  - iii Assessment
    - a) Signs and symptoms
      - i) Pulseless
      - ii) Apneic
      - iii) Cardiac monitor indicating no organized electrical activity or rapid wide complex tachycardia
    - b) History
  - iv Management
    - a) Unmonitored – perform basic life support
    - b) Monitored – defibrillate up to three consecutive shocks
    - c) Airway and ventilation
      - i) Ventilate the patient with 100% oxygen via BVM
      - ii) Intubate patient if poor response to BVM ventilations

- d) Circulation
  - i) Perform chest compressions
- e) Pharmacological
  - i) Medications can be given down the endotracheal tube
  - ii) Administer epinephrine
  - iii) Administer lidocaine
  - iv) Administer bretylium
  - v) After administration of a medication, allow it to circulate for one minute before repeat defibrillation
- f) Non-pharmacological
- g) Transport considerations
- h) Psychological support/ communication strategies
- c) Pulseless electrical activity
  - i) Epidemiology
    - a) Incidence – look for a treatable cause
    - b) Risk factors
    - c) Prevention strategies
  - ii) Pathophysiology
    - a) Pneumothorax
    - b) Cardiac tamponade
    - c) Hypovolemia
    - d) Hypoxia
    - e) Acidosis
    - f) Hypothermia
    - g) Hypoglycemia
  - iii) Assessment
    - a) Signs and symptoms
      - i) Pulseless
      - ii) Apneic
      - iii) Cardiac monitor indicating organized electrical activity
    - b) History
  - iv) Management
    - a) Resuscitation should be directed toward relieving cause
    - b) Airway and ventilation
      - i) Ventilate the patient with 100% oxygen
      - ii) Intubate patient
    - c) Circulation
      - i) Perform chest compressions
    - d) Pharmacological
      - i) Medications can be given down the endotracheal tube
      - ii) Administer epinephrine
    - e) Non-pharmacological
    - f) Transport considerations
    - g) Psychological support/ communication strategies

III Pediatric trauma

A Pathophysiology

- 1 Blunt
  - a Thinner body wall allows forces to be readily transmitted to body contents
  - b Predominant cause of injury in children
- 2 Penetrating
  - a Becoming an increasing problem in adolescents
  - b Higher incidence in the inner city (mostly intentional), but significant incidence in other areas (mostly unintentional)

B Mechanism of injury

- 1 Fall
  - a Single most common cause of injury in children
  - b Serious injury or death resulting from truly accidental falls is relatively uncommon unless from a significant height
  - c Prevention strategies
- 2 Motor vehicle crash
  - a Leading cause of permanent brain injury and new cases of epilepsy
  - b Leading cause of death and serious injury in children
  - c Prevention strategies
- 3 Pedestrian vehicle crash
  - a Particularly lethal form of trauma in children
  - b Initial injury due to impact with vehicle (extremity/ trunk)
  - c Child is thrown from force of impact causing additional injury (head/ spine) upon impact with other objects (ground, another vehicle, light standard, etc.)
  - d Prevention strategies
- 4 Near-drowning
  - a Third leading cause of injury or death in children between birth and 4 years of age
  - b Causes approximately 2000 deaths annually
  - c Severe, permanent brain damage occurs in 5-20% of hospitalized children for near drowning
  - d Prevention strategies
- 5 Penetrating injuries
  - a Risk of death from firearm injuries increase with age
  - b Stab wounds and firearm injuries account for approximately 10-15% of all pediatric trauma admissions
  - c Visual inspection of external injuries can not evaluate the extent of internal involvement
  - d Prevention strategies
- 6 Burns
  - a The leading cause of accidental death in the home for children under the age of 14 years
  - b Burn survival is a function of burn size and concomitant injuries
    - i Modified “rule of nines” is utilized to determine percentage of surface area involved
  - c Prevention strategies

- 7 Physical abuse
  - a Has been classified into four categories – physical abuse, sexual abuse, emotional abuse and child neglect
  - b Social phenomena such as increased poverty, domestic disturbance, younger aged parents, substance abuse, and community violence have been attributed to increase of abuse
  - c Document all pertinent findings, treatments and interventions
  - d Prevention strategies
- C Special considerations
  - 1 Airway control
    - a Maintain in-line stabilization in neutral, not sniffing position
    - b Administer 100% oxygen to all trauma patients
    - c Patent airway must be maintained via suctioning and jaw thrust
    - d Be prepared to assist ineffective respirations
    - e Intubation should be performed when the airway remains inadequate
    - f Gastric tube should be placed after intubation
    - g Needle cricothyroidotomy is rarely indicated for traumatic upper airway obstruction
  - 2 Immobilization
    - a Indications for stabilization and immobilization of cervical spine
    - b Utilize appropriate sized pediatric immobilization equipment
      - i Rigid cervical collar
      - ii Towel/ blanket roll
      - iii Child safety seat
      - iv Pediatric immobilization device
      - v Vest-type/ short wooden backboard
      - vi Long backboard
      - vii Straps, cravats
      - viii Tape
      - ix Padding
    - c Maintain supine neutral in-line position for infants, toddlers, and pre-schoolers by placing padding from the shoulders to the hips
  - 3 Fluid management
    - a Management of the airway and breathing take priority over management of circulation because circulatory compromise is less common in children than adults
    - b Vascular access
      - i Large-bore intravenous catheter should be inserted into a large peripheral vein
      - ii Do not delay transport to gain access
      - iii Intraosseous access in children < 6 years of age if intravenous access fails
      - iv Initial fluid bolus of 20 ml/kg of an lactated ringers or NS
      - v Reassess vital signs and rebolus with 20 ml/kg if no improvement
      - vi If improvement does not occur after the second bolus, there is likely to be significant blood loss and the need for rapid surgical intervention

- 4 Traumatic brain injury
    - a Early recognition and aggressive management can reduce mortality and morbidity
    - b Severity
      - i Mild – GCS is 13 to 15
      - ii Moderate – GCS is 9 to 12
      - iii Severe – GCS is less than or equal to 8
    - c Signs of increased intracranial pressure
      - i Elevated blood pressure
      - ii Bradycardia
        - a) Rapid deep respirations (Kussmaul) progressing to slow, deep respirations alternating with rapid deep respirations (Cheyne-Stokes)
      - iii Bulging fontanelle (infant)
    - d Signs of herniation
      - i Asymmetrical pupils
      - ii Posturing
    - e Specific management
      - i Administer high concentration of oxygen for mild to moderate head injuries (GCS 9-15)
      - ii Intubate and ventilate at normal breathing rate with 100% oxygen for severe head injuries (GCS 3-8)
        - a) Use of lidocaine may blunt rise in ICP (controversial)
        - b) Consider RSI per medical direction
      - iii Indications for hyperventilation
        - a) Asymmetric pupils
        - b) Active seizures
        - c) Neurologic posturing
- D Specific injuries
- 1 Head and neck injury
    - a Larger relative mass of the head and lack of neck muscle strength provides increased momentum in acceleration-deceleration injuries and a greater stress to the cervical spine region
    - b Fulcrum of cervical mobility in the younger child is at the C2-C3 level
    - c 60% to 70% of pediatric fractures occur in C1 or C2
    - d Head injury is the most common cause of death in pediatric trauma victim
    - e Diffuse injuries are common in children, focal injuries are rare
    - f Soft tissues, skull and brain are more compliant in children than in adults
      - i Due to open fontanelles and sutures, infants up to an average age of 16 months may be more tolerant to an increase of intracranial pressure and can have delayed signs
    - g Subdural bleeds in a infant can produce hypotension (extremely rare)
    - h Significant blood loss can occur through scalp lacerations and should be controlled immediately
    - i The Modified Glasgow Coma scale should be utilized for infants and young children

- 2 Chest injury
  - a Chest injuries in children under 14 years of age are usually the result of blunt trauma
  - b Due to the compliance of the chest wall, severe intrathoracic injury can be present without signs of external injury
  - c Tension pneumothorax is poorly tolerated and is an immediate threat to life
  - d Flail segment is an uncommon injury in children; when noted without a significant mechanism of injury, suspect child abuse
  - e Many children with cardiac tamponade will have no physical signs of tamponade other than hypotension
- 3 Abdominal injury
  - a Musculature is minimal and poorly protects the viscera
  - b Organs most commonly injured are liver, kidney and spleen
  - c Onset of symptoms may be rapid or gradual
  - d Due to the small size of the abdomen, be certain to palpate only one quadrant at a time
    - i Any child who is hemodynamically unstable without evidence of obvious source of blood loss should be considered as having an abdominal injury until proven otherwise
- 4 Extremity
  - a Relatively more common in children than adults
  - b Growth plate injuries are common
  - c Compartment syndrome is an emergency in children
  - d Any sites of active bleeding must be controlled
  - e Splinting should be performed to prevent further injury and blood loss
  - f PASG may be useful in unstable pelvic fractures with hypotension
- 5 Burns
  - a Thermal burns in children
  - b Chemical burns in children
  - c Electrical burns in children
  - d Management priorities
    - i Prompt management of the airway is required as swelling can develop rapidly
    - ii If intubation is required, an endotracheal tube up to two sizes smaller than what would normally be used may be required
    - iii Thermally burned children are very susceptible to hypothermia; maintain normal body temperature

**Module VI:**  
**Other Recommended Content Areas**

## Operations

### NREMT PRACTICE ANALYSIS TASK ITEMS

- Prepare the emergency vehicle and equipment before responding to a call
- Drive the emergency vehicle in an emergency situation
- Assess scene safety
- Provide for safety of self, patient and fellow workers
- Take infection control precautions (body substance isolation), Dispose of sharps (needles, auto-injector, etc...), Dispose of materials contaminated with body fluids
- Use body mechanics when lifting and moving a patient

### COGNITIVE OBJECTIVES

At the completion of this unit, the paramedic will be able to:

- 6.1 Discuss the importance of completing an ambulance equipment/ supply checklist. (C-1)
- 6.2 Given a scenario involving arrival at the scene of a motor vehicle collision, assess the safety of the scene and propose ways to make the scene safer. (C-3) / 1-2.11
- 6.3 List factors that contribute to safe vehicle operations. (C-1) / 1-2.12
- 6.4 Describe the considerations that should be given to: (C-1) / 1-2.13
  - a. Using escorts
  - b. Adverse environmental conditions
  - c. Using lights and siren
  - d. Proceeding through intersections
  - e. Parking at an emergency scene
- 6.5 Discuss the concept of "due regard for the safety of all others" while operating an emergency vehicle. (C-1) / 1-2.14
- 6.6 Explain how EMS providers are often mistaken for the police. (C-1) / 8-5.1
- 6.7 Explain specific techniques for risk reduction when approaching the following types of routine EMS scenes: (C-1) / 8-5.2
  - a. Highway encounters
  - b. Violent street incidents
  - c. Residences and "dark houses"
- 6.8 Describe warning signs of potentially violent situations. (C-1) / 8-5.3
- 6.9 Explain emergency evasive techniques for potentially violent situations, including: (C-1) / 8-5.4
  - a. Threats of physical violence.
  - b. Firearms encounters
  - c. Edged weapon encounters
- 6.10 Explain EMS considerations for the following types of violent or potentially violent situations: (C-1) / 8-5.5
  - a. Gangs and gang violence
  - b. Hostage/ sniper situations
  - c. Clandestine drug labs
  - d. Domestic violence
  - e. Emotionally disturbed people
  - f. Hostage/ sniper situations

- 6.11 Explain the following techniques: (C-1) / 8-5.6
  - a. Field "contact and cover" procedures during assessment and care
  - b. Evasive tactics
  - c. Concealment techniques
- 6.12 Describe police evidence considerations and techniques to assist in evidence preservation. (C-1) 8-5.7
- 6.13 Describe the problems that a paramedic might encounter in a hostile situation and the techniques used to manage the situation. (C-1) / 1-2.10
- 6.14 Describe the equipment available for self-protection when confronted with a variety of adverse situations. (C-1) / 1-2.15
- 6.15 Differentiate proper from improper body mechanics for lifting and moving patients in emergency and non-emergency situations. (C-3) / 1-2.9

**AFFECTIVE OBJECTIVES**

At the completion of this unit, the paramedic will be able to:

- 6.16 Assess personal practices relative to ambulance operations, which may affect the safety of the crew, the patient and bystanders. (A-3) / 8-1.6
- 6.17 Serve as a role model for others relative to the operation of ambulances. (A-3) / 8-1.7
- 6.18 Advocate and practice the use of personal safety precautions in all scene situations. (A-3) / 1-2.43
- 6.19 Discuss the importance of universal precautions and body substance isolation practices. (C-1) / 1-2.30
- 6.20 Describe the steps to take for personal protection from airborne and bloodborne pathogens. (C-1) / 1-2.31
- 6.21 Given a scenario, in which equipment and supplies have been exposed to body substances, plan for the proper cleaning, disinfection, and disposal of the items. (C-3) / 1-2.32
- 6.22 Explain what is meant by an exposure and describe principles for management. (C-1) / 1-2.33
- 6.23 Advocate and serve as a role model for other EMS providers relative to body substance isolation practices. (A-3) 1-2.43

**PSYCHOMOTOR OBJECTIVES**

At the completion of this unit, the paramedic will be able to:

- 6.24 Demonstrate the following techniques: (P-1) / 8-5.8
  - a. Field "contact and cover" procedures during assessment and care
  - b. Evasive tactics
  - c. Concealment techniques
- 6.25 Demonstrate the proper procedures to take for personal protection from disease. (P-2) / 1-2.46
- 6.26 Demonstrate safe methods for lifting and moving patients in emergency and non-emergency situations. (P-2) / 1-2.45
- 6.27 Demonstrate how to place a patient in, and remove a patient from, an ambulance. (P-1) / 8-1.9

**Other Suggested Topic Areas**

1. Diagnostic ECG
2. EMS Agenda for the Future issues (such as prevention)
3. Geriatrics
4. Local clinical & technology / equipment update
5. Local quality improvement issues
6. Nationally recognized guidelines / programs for out-of-hospital care (ACLS, AMLS, BTLS, PALS, PEPP, PHTLS, etc)
7. Skills updates / maintenance

## **Appendix A**

### **NREMT Practice Analysis (1999)**

**NREMT Practice Analysis (1999)**

Below is a list of the tasks extracted from the 1999 NREMT Practice Analysis. Each participant involved in the random survey was asked to indicate the frequency in which they utilized an identified task. In addition to frequency, the participants were asked to provide input on the potential of harm and difficulty they experienced in accomplishing each task. The chart below identifies those task, based on either frequency and/or potential for harm, that was used in the creation of this document. The task force utilized those task that were identified as having low frequency of performance and a high potential for harm along with the tasks that had a high frequency of performance and a high potential for harm. 24 of the 123 tasks were identified as meeting the above criteria and were utilized as the basis for the mandatory portion of this refresher curriculum.

Task	Frequency	Potential for Harm
Assess a patient experiencing an allergic reaction	▲	▲
Assess a patient with possible overdose	▲	▲
Assess a near-drowning patient	▲	▲
Assess an infant or child with cardiac arrest	▲	▲
Assess an infant or child with respiratory distress	▲	▲
Assess an infant or child with shock (hypoperfusion)	▲	▲
Assess an infant or child with trauma	▲	▲
Assess a patient with a head injury	▲	▲
Assess a patient with a suspected spinal injury	▲	▲
Perform a rapid trauma assessment	▲	▲
Provide ventilatory support for a patient	▲	▲
Attempt to resuscitate a patient in cardiac arrest	▲	▲
Provide care to a patient experiencing cardiovascular compromise	▲	▲
Provide post-resuscitation care to a cardiac arrest patient	▲	▲
Provide care to the patient experiencing an allergic reaction	▲	▲
Provide care to a near-drowning patient	▲	▲
Provide care to an infant or child with cardiac arrest	▲	▲
Provide care to an infant or child with respiratory distress	▲	▲
Provide care to an infant or child with shock (hypoperfusion)	▲	▲
Provide care to an infant or child with trauma	▲	▲
Provide care to a patient with a chest injury	▲	▲
Provide care to a patient with an open abdominal injury	▲	▲
Provide care to a patient with shock (hypoperfusion)	▲	▲
Provide care to a patient with suspected spinal injury	▲	▲

## **Appendix B**

### **Practice Scenario and Scenario Template**

## Scenario Template

Lectures have traditionally been the backbone for most educational endeavors. While this type of education process has been used in the past, today's students are seeking greater challenges in the classroom. One alternative method for education is the use of scenario based education. Scenario based education allows the instructor and student to achieve a more realistic approach to patient care situations. This refresher curriculum can be delivered to the experienced provider through the use of scenarios.

This scenario template has been included for use during the refresher course. The template was designed by the NREMT for use with their oral scenario station. The recommendation would be for the instructor to develop scenarios that met the objectives of this curriculum for use in the classroom portion as well as the skill labs.

<b>BACKGROUND INFORMATION</b>	
EMS System description (including urban/rural setting)	
Vehicle type/response capabilities	
Proximity to and level/type of facilities	
<b>DISPATCH INFORMATION</b>	
Nature of the call	
Location	
Dispatch time	
Weather	
Personnel on scene	
<b>SCENE SURVEY INFORMATION</b>	
Scene considerations	
Patient location	
Visual appearance	
Age, gender, weight	
Immediate surroundings (bystanders, family members present, etc.)	
<b>PATIENT ASSESSMENT</b>	
Chief complaint	
History of present illness/injury	
Patient responses, symptoms, and pertinent negatives	
<b>PAST MEDICAL HISTORY</b>	
Past medical history	
Medications and allergies	
Social/family concerns	

<b>EXAMINATION FINDINGS</b>	
Initial vital signs	B/P P R SpO <sub>2</sub>
Respiratory	
Cardiovascular	
Gastrointestinal	
Genitourinary	
Musculoskeletal	
Neurologic	
Integumentary	
Hematologic	
Immunologic	
Endocrine	
Psychiatric	
<b>PATIENT MANAGEMENT</b>	
Initial stabilization	
Treatments	
Monitoring	
Additional resources	
Patient response to interventions	
<b>TRANSPORT DECISION</b>	
Lifting and moving the patient	
Mode	
Facilities	
<b>CONCLUSION</b>	
Field impression	
Rationale for field impression	
Related pathophysiology	
Verbal report	
<b>MANDATORY ACTIONS</b>	
<b>POTENTIALLY HARMFUL/DANGEROUS ACTIONS ORDERED/PERFORMED</b>	

**Practice Scenario**

<b>BACKGROUND INFORMATION</b>	
EMS System description (including urban/rural setting)	Suburban EMS that responds to both emergency and non-emergency calls
Vehicle type/response capabilities	2 person paramedic level transporting service
Proximity to and level/type of facilities	30 minutes to the attending physician's office 15 minutes to the community hospital
<b>DISPATCH INFORMATION</b>	
Nature of the call	Woman can't walk, requests transport to her physician's office, non-emergent
Location	Well kept walk-up single family dwelling
Dispatch time	1512 hours
Weather	68° F, clear spring day
Personnel on scene	Daughter who is serving as primary care giver
<b>SCENE SURVEY INFORMATION</b>	
Scene considerations	10 cement steps up to the front door No access for stretcher from any other doorway
Patient location	1 <sup>st</sup> floor, back bedroom, narrow hallways & doorways
Visual appearance	Patient sitting in bed with multiple pillows holding her in an upright position, pale in color, does not respond to your presents in the room
Age, gender, weight	58 year old female, 200 pounds
Immediate surroundings (bystanders, family members present, etc.)	Clean, neat, well-kept surroundings Daughter is only family member present
<b>PATIENT ASSESSMENT</b>	
Chief complaint	Altered level of consciousness
History of present illness/injury	Daughter states "My Mother just passed out a couple of minutes ago from the pain." Patient woke this morning with a painful left leg that has increased in pain, unable to walk without severe pain. Daughter states that her mother, "Has a small sore on her left inner thigh that has gotten bigger over the past few hours and her doctor wants to see her in his office."
Patient responses, symptoms, and pertinent negatives	Patient opens her eyes to loud verbal stimulus but does not verbally respond
<b>PAST MEDICAL HISTORY</b>	
Past medical history	Adult onset of diabetes controlled with diet and oral medication, hypertension, hernia repair several years ago
Medications and allergies	Glucophage bid, Lasix 20 mg qid, diltiazem qid, and Colace qid NKA
Social/family concerns	Patient lives alone after death of husband two years ago, daughter comes to her home each day to help mother with daily chores

<b>EXAMINATION FINDINGS</b>	
Initial vital signs	B/P 100/pa;pation P 130, rapid and weak R 8
Respiratory	Lung sounds are diminished bilaterally
Cardiovascular	Tachycardia, hypotensive
Gastrointestinal	-----
Genitourinary	-----
Musculoskeletal	-----
Neurologic	Opens her eyes to loud verbal stimulus and withdraws to pain Utters incomprehensible sounds Pupils equal and responds sluggishly to light
Integumentary	Large ecchymotic area over the patient's entire left inner thigh extending into the groin, pelvis, and left lower abdomen Area is hot to touch with crepitation under the skin Skin is pale, hot, and moist to the touch
Hematologic	----
Immunologic	----
Endocrine	Blood glucose 370 mg/dL
Psychiatric	----
<b>PATIENT MANAGEMENT</b>	
Initial stabilization	Assisted ventilations with high flow oxygen
Treatments	Assisted ventilations with high flow oxygen, IV enroute
Monitoring	ECG – sinus tachycardia, SpO <sub>2</sub> – 85%
Additional resources	Consider transportation to facility with immediate surgical capabilities and hyperbarics
Patient response to interventions	No change
<b>TRANSPORT DECISION</b>	
Lifting and moving the patient	Place in Reeves stretcher to ambulance stretcher
Mode	Rapid
Facilities	Emergency department
<b>CONCLUSION</b>	
Field impression	Septic shock
Rationale for field impression	Rapidly extending extremity infection, febrile, hypotension, and tachycardia with altered LOC
Related pathophysiology	“What is the basis for septic shock in this case?” Sever bacterial infection
Verbal report	“Please provide me with a verbal report on this patient.” Must include chief complaint, interventions, current patient condition, and ETA
<b>MANDATORY ACTIONS</b>	
Rapid identification of life-threat and immediate transportation to the emergency department High flow oxygen	
<b>POTENTIALLY HARMFUL/DANGEROUS ACTIONS ORDERED/PERFORMED</b>	
Delayed transportation for on scene interventions Taking the patient to the doctor's office	

**BACKGROUND & DISPATCH INFORMATION**

You are a paramedic on a transporting paramedic unit.  
You are working with a paramedic partner in a suburban EMS system.  
You are thirty (30) minutes away from the attending physician's office  
and fifteen (15) minutes from the community hospital.

At 1512 hours, you are dispatched to a residence for a non-emergent transport of a woman to her doctor's office. It is a clear spring day with temperature of 68° F. A woman who identifies herself as the patient's daughter meets you at the door.

# **Appendix C**

## **Practical Evaluation Skill Sheets**

**(Modeled after the NREMT Practical Skill Sheets)**

The practical skill sheets included in this appendix were modeled after the National Registry of Emergency Medical Technicians' (NREMT) Advanced Level Practical Examination for the 1998 EMT-Paramedic National Standard Curriculum. These skill sheets should not be used as a substitute during a NREMT Advanced Level Practical Examination. The sheets were designed to be used as a standardized evaluation instrument for determining an individual's competency for an identified psychomotor skill.



**Modeled after the National Registry of Emergency Medical Technicians Advanced Level Practical Examination**

**Ventilatory Management – Adult**

Candidate: \_\_\_\_\_ Examiner: \_\_\_\_\_

Date: \_\_\_\_\_ Signature: \_\_\_\_\_

**NOTE: If candidate elects to ventilate initially with BVM attached to reservoir and oxygen, full credit must be awarded for steps denoted by “\*” so long as first ventilation is delivered within 30 seconds**

	Possible Points	Points Awarded
Takes or verbalizes body substance isolation precautions	1	
Opens the airway manually	1	
Elevates tongue, inserts simple adjunct {oropharyngeal or nasopharyngeal airway}	1	
<b>Note: Examiner now informs candidate no gag reflex is present and patient accepts adjunct</b>		
“*” Ventilates patient immediately with bag-valve-mask device unattached to oxygen	1	
“*” Hyperventilates patient with room air	1	
<b>Note: Examiner now informs candidate that ventilation is being performed without difficulty and that pulse oximetry indicates the patient’s blood oxygen saturation is 85%</b>		
Attaches oxygen reservoir to bag-mask device and connects to high flow oxygen regulator [12-15 L/min]	1	
Ventilates patient at a rate of 10-20/minute with appropriate volumes	1	
<b>Note: After 30 seconds, examiner auscultates and reports breath sounds are present, equal bilaterally and medical direction has ordered intubation. The examiner must now take over ventilation</b>		
Directs assistant to pre-oxygenate patient	1	
Identifies/selects proper equipment for intubation	1	
Checks equipment for: -Cuff leaks (1 point) -Laryngoscope operational with bulb tight (1 point)	2	
<b>Note: Examiner to remove OPA and move out of the way when candidate is prepared to intubate</b>		
Positions head properly	1	
Inserts blade while displacing tongue	1	
Elevates mandible with laryngoscope	1	
Introduces ET tube and advances to proper depth	1	
Inflates cuff to proper pressure and disconnects syringe	1	
Confirms proper placement by auscultation bilaterally over each lung and over epigastrium	1	
<b>Note: Examiner to ask “If you had proper placement, what should you expect to hear?”</b>		
Secures ET tube (may be verbalized)	1	
<b>Note: Examiner now asks candidate, “Please demonstrate one additional method of verifying proper tube placement in this patient.”</b>		
Identifies/selects proper equipment	1	
Verbalizes findings and interpretations [compares indicator color to the colorimetric scale and states reading to examiner]	1	
<b>Note: Examiner now states, “You see secretions in the tube and hear gurgling sounds with the patient’s exhalations.”</b>		
Identifies/selects a flexible suction catheter	1	
Pre-oxygenates patient	1	
Marks maximum insertion length with thumb and forefinger	1	
Inserts catheter into ET tube leaving catheter port open	1	
At proper insertion depth, covers catheter port and applies suction while withdrawing catheter	1	
Ventilates/directs ventilation of patient as catheter is flushed with sterile water	1	
<b>Total</b>	<b>27</b>	

**CRITICAL CRITERIA**

- \_\_\_\_\_ Failure to initiate ventilations within 30 seconds after applying gloves or interrupts ventilations for greater than 30 seconds at any time
- \_\_\_\_\_ Failure to take or verbalize body substance isolation precautions
- \_\_\_\_\_ Failure to voice and ultimately provide high oxygen concentration [at least 85%]
- \_\_\_\_\_ Failure to ventilate patient at a rate of at least 10/minute
- \_\_\_\_\_ Failure to provide adequate volumes per breath [maximum 2 errors/minute permissible]
- \_\_\_\_\_ Failure to pre-oxygenate patient prior to intubation and suctioning
- \_\_\_\_\_ Failure to successfully intubate within 3 attempts
- \_\_\_\_\_ Failure to disconnect syringe **immediately** after inflating cuff of ET tube
- \_\_\_\_\_ Uses teeth as a fulcrum
- \_\_\_\_\_ Failure to assure proper tube placement by auscultation bilaterally **and** over the epigastrium
- \_\_\_\_\_ If used, stylet extends beyond end of ET tube
- \_\_\_\_\_ Inserts any adjunct in a manner dangerous to the patient
- \_\_\_\_\_ Suctions the patient for more than 15 seconds
- \_\_\_\_\_ Does not suction the patient

**You must factually document your rationale for checking any of the above critical items on the reverse side of this form.**



**Modeled after the National Registry of Emergency Medical Technicians Advanced Level Practical Examination**

**Dynamic Cardiology**

Candidate: \_\_\_\_\_

Examiner: \_\_\_\_\_

Date: \_\_\_\_\_

Signature: \_\_\_\_\_

Level of testing:  NREMT-Intermediate/99

NREMT-Paramedic

Time start: \_\_\_\_\_

	Possible Points	Points Awarded
Takes or verbalizes infection control precautions	1	
Checks level of responsiveness	1	
Checks ABCs	1	
Initiates CPR if appropriate [verbally]	1	
Attaches ECG monitor in a timely fashion or applies paddles for "Quick Look"	1	
Correctly interprets initial rhythm	1	
Appropriately manages initial rhythm	2	
Notes change in rhythm	1	
Checks patient condition to include pulse and, if appropriate, BP	1	
Correctly interprets second rhythm	1	
Appropriately manages second rhythm	2	
Notes change in rhythm	1	
Checks patient condition to include pulse and, if appropriate, BP	1	
Correctly interprets third rhythm	1	
Appropriately manages third rhythm	2	
Notes change in rhythm	1	
Checks patient condition to include pulse and, if appropriate, BP	1	
Correctly interprets fourth rhythm	1	
Appropriately manages fourth rhythm	2	
Orders high percent of supplemental oxygen at proper times	1	
<b>Time end: _____</b>	<b>Total</b>	<b>24</b>

**CRITICAL CRITERIA**

- \_\_\_\_\_ Failure to deliver first shock in a timely manner due to operator delay in machine use or providing treatments other than CPR with simple adjuncts
- \_\_\_\_\_ Failure to deliver second or third shocks without delay other than the time required to reassess rhythm and recharge paddles
- \_\_\_\_\_ Failure to verify rhythm before delivering each shock
- \_\_\_\_\_ Failure to ensure the safety of self and others [verbalizes "All Clear" and observes]
- \_\_\_\_\_ Inability to deliver DC shock [does not use machine properly]
- \_\_\_\_\_ Failure to demonstrate acceptable shock sequence
- \_\_\_\_\_ Failure to order initiation or resumption of CPR when appropriate
- \_\_\_\_\_ Failure to order correct management of airway [ET when appropriate]
- \_\_\_\_\_ Failure to order administration of appropriate oxygen at proper time
- \_\_\_\_\_ Failure to diagnose or treat 2 or more rhythms correctly
- \_\_\_\_\_ Orders administration of an inappropriate drug or lethal dosage
- \_\_\_\_\_ Failure to correctly diagnose or adequately treat v-fib, v-tach, or asystole

***You must factually document your rationale for checking any of the above critical items on the reverse side of this form.***

**Modeled after the National Registry of Emergency Medical Technicians Advanced Level Practical Examination**

**Static Cardiology**

Candidate: \_\_\_\_\_

Examiner: \_\_\_\_\_

Date: \_\_\_\_\_

Signature: \_\_\_\_\_

Set # \_\_\_\_\_

Level of testing:  NREMT-Intermediate/99

NREMT-Paramedic

**Note: No points for treatment may be awarded if the diagnosis is incorrect.**

**Only document incorrect responses in space provided**

Time start: \_\_\_\_\_

	Possible Points	Points Awarded
STRIP #1		
Diagnosis:	1	
Treatment:	2	
STRIP #2		
Diagnosis:	1	
Treatment:	2	
STRIP #3		
Diagnosis:	1	
Treatment:	2	
STRIP #4		
Diagnosis:	1	
Treatment:	2	
<b>Time end: _____</b>	<b>Total</b>	<b>12</b>

**Modeled after the National Registry of Emergency Medical Technicians Advanced Level Practical Examination**

**Oral Station**

Candidate: \_\_\_\_\_

Examiner: \_\_\_\_\_

-

Date: \_\_\_\_\_

Signature: \_\_\_\_\_

Scenario: \_\_\_\_\_

Time start: \_\_\_\_\_

	Possible Points	Points Awarded
<b>Scene Management</b>		
Thoroughly assessed and took deliberate actions to control the scene	3	
Assessed the scene, identified potential hazards, did not put anyone in danger	2	
Incompletely assessed or managed the scene	1	
Did not assess or manage the scene	0	
<b>Patient Assessment</b>		
Completed an organized assessment and integrated findings to expand further assessment	3	
Completed initial, focused, and ongoing assessments	2	
Performed an incomplete or disorganized assessment	1	
Did not complete an initial assessment	0	
<b>Patient Management</b>		
Managed all aspects of the patient's condition and anticipated further needs	3	
Appropriately managed the patient's presenting condition	2	
Performed an incomplete or disorganized management	1	
Did not manage life-threatening conditions	0	
<b>Interpersonal Relations</b>		
Established rapport and interacted in an organized, therapeutic manner	3	
Interacted and responded appropriately with patient, crew, and bystanders	2	
Used inappropriate communication techniques	1	
Demonstrated intolerance for patient, bystanders, and crew	0	
<b>Integration (verbal report, field impression, and transport decision)</b>		
Stated correct field impression and pathophysiology basis, provided succinct and accurate verbal report including social/psychological concerns, and considered alternate transport destinations	3	
Stated correct field impression, provided succinct and accurate verbal report, and appropriately stated transport decision	2	
Stated correct field impression, provided inappropriate verbal report or transport decision	1	
Stated incorrect field impression or did not provide verbal report	0	
Time end: _____	<b>Total</b>	<b>15</b>

**CRITICAL CRITERIA**

\_\_\_\_\_ Failure to appropriately address any of the Scenario's "Mandatory Actions"

\_\_\_\_\_ Performs or orders any harmful or dangerous action or intervention

*You must factually document your rationale for checking any of the above critical items on the reverse side of this form.*

**Modeled after the National Registry of Emergency Medical Technicians Advanced Level Practical Examination**

**Intravenous Therapy**

Candidate: \_\_\_\_\_ Examiner: \_\_\_\_\_

Date: \_\_\_\_\_ Signature: \_\_\_\_\_

Level of testing:                       NREMT-Intermediate/99                       NREMT-Paramedic

Time start: _____	Possible Points	Points Awarded
Checks selected IV fluid for: -Proper fluid (1 point) -Clarity (1 point)	2	
Selects appropriate catheter	1	
Selects proper administration set	1	
Connects IV tubing to the bag	1	
Prepares administration set [fills drip chamber and flushes tubing]	1	
Cuts or tears tape [at any time before venipuncture]	1	
Takes/verbalizes body substance isolation precautions [prior to venipuncture]	1	
Applies tourniquet	1	
Palpates suitable vein	1	
Cleanses site appropriately	1	
Performs venipuncture -Inserts stylet (1 point) -Notes or verbalizes flashback (1 point) -Occludes vein proximal to catheter (1 point) -Removes stylet (1 point) -Connects IV tubing to catheter (1 point)	5	
Disposes/verbalizes disposal of needle in proper container	1	
Releases tourniquet	1	
Runs IV for a brief period to assure patent line	1	
Secures catheter [tapes securely or verbalizes]	1	
Adjusts flow rate as appropriate	1	
<b>Time end: _____</b>	<b>Total</b>	<b>21</b>

**CRITICAL CRITERIA**

- \_\_\_\_\_ Failure to establish a patent and properly adjusted IV within 6 minute time limit
- \_\_\_\_\_ Failure to take or verbalize body substance isolation precautions prior to performing venipuncture
- \_\_\_\_\_ Contaminates equipment or site without appropriately correcting situation
- \_\_\_\_\_ Performs any improper technique resulting in the potential for uncontrolled hemorrhage, catheter shear, or air embolism
- \_\_\_\_\_ Failure to successfully establish IV within 3 attempts during 6 minute time limit
- \_\_\_\_\_ Failure to dispose/verbalize disposal of needle in proper container

**Note:** Check here (  ) if candidate did not establish a patent IV and do not evaluate IV Bolus Medications

**Intravenous Bolus Medications**

Time start: _____	Possible Points	Points Awarded
Asks patient for known allergies	1	
Selects correct medication	1	
Assures correct concentration of drug	1	
Assembles prefilled syringe correctly and dispels air	1	
Continues body substance isolation precautions	1	
Cleanses injection sit [Y-port or hub]	1	
Reaffirms medication	1	
Stops IV flow [pinches tubing or shuts off]	1	
Administers correct dose at proper push rate	1	
Disposes/verbalizes proper disposal of syringe and needle in proper container	1	
Flushes tubing [runs wide open for a brief period]	1	
Adjusts drip rate to TKO/KVO	1	
Verbalizes need to observe patient for desired effect/adverse side effects	1	
<b>Time end: _____</b>	<b>Total</b>	<b>13</b>

**CRITICAL CRITERIA**

- \_\_\_\_\_ Failure to begin administration of medication within 3 minute time limit
- \_\_\_\_\_ Contaminates equipment or site without appropriately correcting situation
- \_\_\_\_\_ Failure to adequately dispel air resulting in potential for air embolism
- \_\_\_\_\_ Injects improper drug or dosage [wrong drug, incorrect amount, or pushes at inappropriate rate]
- \_\_\_\_\_ Failure to flush IV tubing after injecting medication
- \_\_\_\_\_ Recaps needle or failure to dispose/verbalize disposal of syringe and needle in proper container

*You must factually document your rationale for checking any of the above critical items on the reverse side of this form.*

**Modeled after the National Registry of Emergency Medical Technicians Advanced Level Practical Examination**

**Pediatric (<2 yrs.) Ventilatory Management**

Candidate: \_\_\_\_\_

Examiner: \_\_\_\_\_

Date: \_\_\_\_\_

Signature: \_\_\_\_\_

**NOTE: If candidate elects to ventilate initially with BVM attached to reservoir and oxygen, full credit must be awarded for steps denoted by “\*” so long as first ventilation is delivered within 30 seconds**

	Possible Points	Points Awarded
Takes or verbalizes body substance isolation precautions	1	
Opens the airway manually	1	
Elevates tongue, inserts simple adjunct {oropharyngeal or nasopharyngeal airway}	1	
<b>Note: Examiner now informs candidate no gag reflex is present and patient accepts adjunct</b>		
“*” Ventilates patient immediately with bag-valve-mask device unattached to oxygen	1	
“*” Hyperventilates patient with room air	1	
<b>Note: Examiner now informs candidate that ventilation is being performed without difficulty and that pulse oximetry indicates the patient’s blood oxygen saturation is 85%</b>		
Attaches oxygen reservoir to bag-mask device and connects to high flow oxygen regulator [12-15 L/min]	1	
Ventilates patient at a rate of 20-30/minute and assures adequate chest expansion	1	
<b>Note: After 30 seconds, examiner auscultates and reports breath sounds are present, equal bilaterally and medical direction has ordered intubation. The examiner must now take over ventilation</b>		
Directs assistant to pre-oxygenate patient	1	
Identifies/selects proper equipment for intubation	1	
Checks laryngoscope to assure operational with bulb tight	1	
<b>Note: Examiner to remove OPA and move out of the way when candidate is prepared to intubate</b>		
Places patient in neutral or sniffing position	1	
Inserts blade while displacing tongue	1	
Elevates mandible with laryngoscope	1	
Introduces ET tube and advances to proper depth	1	
Directs ventilation of patient	1	
Confirms proper placement by auscultation bilaterally over each lung and over epigastrium	1	
<b>Note: Examiner to ask “If you had proper placement, what should you expect to hear?”</b>		
Secures ET tube (may be verbalized)	1	
<b>Total</b>	<b>17</b>	

**CRITICAL CRITERIA**

- \_\_\_\_\_ Failure to initiate ventilations within 30 seconds after applying gloves or interrupts ventilations for greater than 30 seconds at any time
- \_\_\_\_\_ Failure to take or verbalize body substance isolation precautions
- \_\_\_\_\_ Failure to pad under the torso to allow neutral head position or sniffing position
- \_\_\_\_\_ Failure to voice and ultimately provide high oxygen concentration [at least 85%]
- \_\_\_\_\_ Failure to ventilate patient at a rate of at least 20/minute
- \_\_\_\_\_ Failure to provide adequate volumes per breath [maximum 2 errors/minute permissible]
- \_\_\_\_\_ Failure to pre-oxygenate patient prior to intubation
- \_\_\_\_\_ Failure to successfully intubate within 3 attempts
- \_\_\_\_\_ Uses teeth as a fulcrum
- \_\_\_\_\_ Failure to assure proper tube placement by auscultation bilaterally **and** over the epigastrium
- \_\_\_\_\_ Inserts any adjunct in a manner dangerous to the patient
- \_\_\_\_\_ Attempts to use any equipment not appropriate for the pediatric patient

**You must factually document your rationale for checking any of the above critical items on the reverse side of this form.**

**Modeled after the National Registry of Emergency Medical Technicians Advanced Level Practical Examination**

**Pediatric Intraosseous Infusion**

Candidate: \_\_\_\_\_

Examiner: \_\_\_\_\_

Date: \_\_\_\_\_

Signature: \_\_\_\_\_

<b>Time start:</b> _____	Possible Points	Points Awarded
Checks selected IV fluid for: -Proper fluid (1 point) -Clarity (1 point)	2	
Selects appropriate equipment to include: -IO needle (1 point) -Syringe (1 point) -Saline (1 point) -Extension set (1 point)	4	
Selects proper administration set	1	
Connects administration set to bag	1	
Prepares administration set [fills drip chamber and flushes tubing]	1	
Prepares syringe and extension tubing	1	
Cuts or tears tape [at any time before IO puncture]	1	
Takes or verbalizes body substance isolation precautions [prior to IO puncture]	1	
Identifies proper anatomical site for IO puncture	1	
Cleanses site appropriately	1	
Performs IO puncture: -Stabilizes tibia (1 point) -Inserts needle at proper angle (1 point) -Advances needle with twisting motion until “pop” is felt (1 point) -Unscrews cap and removes stylet from needle (1 point)	4	
Disposes of needle in proper container	1	
Attaches syringe and extension set to IO needle and aspirates	1	
Slowly injects saline to assure proper placement of needle	1	
Connects administration set and adjusts flow rate as appropriate	1	
Secures needle with tape and supports with bulky dressing	1	
<b>Time end:</b> _____	<b>Total</b>	<b>23</b>

**CRITICAL CRITERIA**

- \_\_\_\_\_ Failure to establish a patent and properly adjusted IO within 6 minute time limit
- \_\_\_\_\_ Failure to take or verbalize body substance isolation precautions prior to performing IO puncture
- \_\_\_\_\_ Contaminates equipment or site without appropriately correcting situation
- \_\_\_\_\_ Performs any improper technique resulting in the potential for air embolism
- \_\_\_\_\_ Failure to assure correct needle placement before attaching administration set
- \_\_\_\_\_ Failure to successfully establish IO infusion within 2 attempts during 6 minute time limit
- \_\_\_\_\_ Performing IO puncture in an unacceptable manner [improper site, incorrect needle angle, etc.]
- \_\_\_\_\_ Failure to dispose of needle in proper container
- \_\_\_\_\_ Orders or performs any dangerous or potentially harmful procedure

***You must factually document your rationale for checking any of the above critical items on the reverse side of this form.***

**Modeled after the National Registry of Emergency Medical Technicians Advanced Level  
Practical Examination**

**Spinal Immobilization (Seated Patient)**

Candidate: \_\_\_\_\_

Examiner: \_\_\_\_\_

Date: \_\_\_\_\_

Signature: \_\_\_\_\_

<b>Time start:</b> _____	Possible Points	Points Awarded
Takes or verbalizes body substance isolation precautions	1	
Directs assistant to place/maintain head in the neutral, in-line position	1	
Directs assistant to maintain manual immobilization of the head	1	
Reassesses motor, sensory, and circulation function in each extremity	1	
Applies appropriately sized extrication collar	1	
Positions the immobilization device behind the patient	1	
Secures the device to the patient's torso	1	
Evaluates torso fixation and adjusts as necessary	1	
Evaluates and pads behind the patient's head as necessary	1	
Secures the patient's head to the device	1	
Verbalizes moving the patient to a long backboard	1	
Reassesses motor, sensory, and circulation function in each extremity	1	
<b>Time end:</b> _____	<b>Total</b>	<b>12</b>

**CRITICAL CRITERIA**

- \_\_\_\_\_ Did not immediately direct or take manual immobilization of the head
- \_\_\_\_\_ Did not properly apply appropriately sized cervical collar before ordering release of manual immobilization
- \_\_\_\_\_ Released or ordered release of manual immobilization before it was maintained mechanically
- \_\_\_\_\_ Manipulated or moved patient excessively causing potential spinal compromise
- \_\_\_\_\_ Head immobilized to the device **before** device sufficiently secured to torso
- \_\_\_\_\_ Device moves excessively up, down, left, or right on the patient's torso
- \_\_\_\_\_ Head immobilization allows for excessive movement
- \_\_\_\_\_ Torso fixation inhibits chest rise, resulting in respiratory compromise
- \_\_\_\_\_ Upon completion of immobilization, head is not in a neutral, in-line position
- \_\_\_\_\_ Did not reassess motor, sensory, and circulation functions in each extremity after voicing immobilization to the long backboard

***You must factually document your rationale for checking any of the above critical items on the reverse side of this form.***

**Modeled after the National Registry of Emergency Medical Technicians Advanced Level  
Practical Examination**

**Spinal Immobilization (Supine Patient)**

Candidate: \_\_\_\_\_

Examiner: \_\_\_\_\_

Date: \_\_\_\_\_

Signature: \_\_\_\_\_

<b>Time start:</b> _____	Possible Points	Points Awarded
Takes or verbalizes body substance isolation precautions	1	
Directs assistant to place/maintain head in the neutral, in-line position	1	
Directs assistant to maintain manual immobilization of the head	1	
Reassesses motor, sensory, and circulation function in each extremity	1	
Applies appropriately sized extrication collar	1	
Positions the immobilization device appropriately	1	
Directs movement of the patient onto the device without compromising the integrity of the spine	1	
Applies padding to the voids between the torso and the device as necessary	1	
Immobilizes the patient's torso to the device	1	
Evaluates and pads behind the patient's head as necessary	1	
Secures the patient's head to the device	1	
Secures the patient's legs to the device	1	
Secures the patient's arms to the device	1	
Reassesses motor, sensory, and circulation function in each extremity	1	
<b>Time end:</b> _____	<b>Total</b>	<b>14</b>

**CRITICAL CRITERIA**

- \_\_\_\_\_ Did not immediately direct or take manual immobilization of the head
- \_\_\_\_\_ Did not properly apply appropriately sized cervical collar before ordering release of manual immobilization
- \_\_\_\_\_ Released or ordered release of manual immobilization before it was maintained mechanically
- \_\_\_\_\_ Manipulated or moved patient excessively causing potential spinal compromise
- \_\_\_\_\_ Head immobilized to the device **before** device sufficiently secured to torso
- \_\_\_\_\_ Device moves excessively up, down, left, or right on the patient's torso
- \_\_\_\_\_ Head immobilization allows for excessive movement
- \_\_\_\_\_ Upon completion of immobilization, head is not in a neutral, in-line position
- \_\_\_\_\_ Did not reassess motor, sensory, and circulation functions in each extremity after voicing immobilization to the device

***You must factually document your rationale for checking any of the above critical items on the reverse side of this form.***

**Modeled after the National Registry of Emergency Medical Technicians Advanced Level  
Practical Examination**

**Bleeding Control / Shock Management**

Candidate: \_\_\_\_\_

Examiner: \_\_\_\_\_

Date: \_\_\_\_\_

Signature: \_\_\_\_\_

<b>Time Started:</b> _____	<b>Possible Points</b>	<b>Points Awarded</b>
Takes or verbalizes body substance isolation precautions	1	
Applies direct pressure to the wound	1	
Elevates the extremity	1	
<b>NOTE: The examiner must now inform the candidate that the wound continues to bleed.</b>		
Applies an additional dressing to the wound	1	
<b>NOTE: The examiner must now inform the candidate that the wound still continues to bleed. The second dressing does not control the bleeding.</b>		
Locates and applies pressure to appropriate pressure point	1	
<b>NOTE: The examiner must now inform the candidate that the bleeding is controlled</b>		
Bandages the wound	1	
<b>NOTE: The examiner must now inform the candidate that the patient is exhibiting signs and symptoms of hypoperfusion.</b>		
Properly positions the patient	1	
Administers high concentration oxygen	1	
Initiates steps to prevent heat loss from the patient	1	
Indicates the need for immediate transport	1	
<b>Time End:</b> _____	<b>TOTAL</b>	10

**CRITICAL CRITERIA**

- \_\_\_\_\_ Did not take or verbalize body substance isolation precautions
- \_\_\_\_\_ Did not apply high concentration of oxygen
- \_\_\_\_\_ Applied a tourniquet before attempting other methods of bleeding control
- \_\_\_\_\_ Did not control hemorrhage in a timely manner
- \_\_\_\_\_ Did not indicate a need for immediate transportation

***You must factually document your rationale for checking any of the above critical items on the reverse side of this form.***