Wisconsin Standardized Paramedic Curriculum

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Wisconsin Department of Health Services, EMS Section

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2011 – Wisconsin Paramedic Curriculum

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0.0 – Introduction

0.1 – Wisconsin Paramedic Program Outcomes

Upon successful completion of a Wisconsin Paramedic program, the student should be able to:

1. Prepare for incident response and EMS operations.
2. Integrate pathophysiological principles and assessment findings for a variety of patient encounters.
3. Demonstrate Paramedic skills associated with established standards and procedures for a variety of patient encounters.
4. Communicate effectively with others.
5. Demonstrate professional behavior.
6. Meet state and national competency requirements for Paramedic credentialing.

0.2 – Curriculum Background and EMS Training Center Adaptation

The Wisconsin 2011 Paramedic Curriculum was adapted from the January 2009 "National Emergency Medical Services Education Standards – Paramedic Instructional Guidelines" as published by the National Highway Traffic Safety Administration, under the United States Department of Transportation.

The Wisconsin Paramedic Scope of Practice integrated into this document was defined by the State EMS Board Physicians Advisory Committee, based upon their modifications to the February 2007 "National EMS Scope of Practice Model" as published by the National Highway Traffic Safety Administration, under the United States Department of Transportation.

It is recognized that the educational standards included as a part of this curriculum are not all-inclusive and additional content may be added at the discretion of the EMS Training Center to meet local needs or requirements.

Objectives are divided into Cognitive, Psychomotor, and Affective domains, denoted by a C, P, and A, respectively, before the objective number.

0.3 – Program Prerequisites / Presumption of Prerequisite Education

The objectives and educational standards contained herein are designed specifically for initial paramedic training. To participate in such training, the student must already have completed an Emergency Medical Technician (formerly, EMT-Basic) course. The presumption is that the student has previously met all objectives at the Emergency Medical Technician level. As a result, to alleviate redundancy, competencies previously covered

within the Emergency Medical Technician course are typically not incorporated into this curriculum. (Stated another way, the objectives and educational standards within this paramedic curriculum are considered "over and above" those previously delivered and/or met through a state-approved Emergency Medical Technician course.)

If prerequisite knowledge remediation is required or questions arise with regard to the objectives or educational standards covered within the Emergency Medication Technician course, paramedic instructors should reference the Wisconsin Emergency Medical Technician Curriculum.

0.4 – Wisconsin 2011 Paramedic Curriculum Committee Members

Paramedic Curriculum Committee Chair
Shirley Strong (Fox Valley Technical College)

Paramedic Curriculum Recording Secretary
Cheryl Kuhn (Milwaukee County EMS)

State EMS Board, Education and Training Committee Liaison
Gregory West (Waukesha County Technical College)

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Karen Barker (Gateway Technical College)
Bradley Bowen (Lake Country Fire and Rescue)
Julie Brady (Waukesha County Technical College)
Leonard Langkau (Fox Valley Technical College)
Daniel McCourt (Fox Valley Technical College)
Beth Natter (Mercy Regional EMS Training Center)

0.5 – Course Structure and Topical Hour Guidelines

While the curriculum contained within this document is structured/organized as provided in the Educational Standards, the following topic progression and associated hours are recommended (*the following table does not include hours associated with clinical and/or field experiences*):

Topic	Didactic	Laboratory	Total
1.0 – Preparatory	28	0	28
6.0 – Public Health	2	0	2
3.0 – Medical Terminology	6	0	6
2.0 – Anatomy and Physiology	14	0	14
4.0 – Pathophysiology	46	0	46
11.1.12 - Shock	6	0	6

10.4 – Immunology	3	0	3
12.2 - Bleeding	3	0	3
5.0 – Life Span Development	4	0	4
9.0 – Patient Assessment	20	30	50
10.1 – Medical Overview	4	6	10
13.3.1 – Pediatric Anatomical Variations and Assessment	2	0	2
13.3.2 – [Pediatric] Growth and Development	2	0	2
13.4.1 – Normal and Abnormal Changes Associated with Aging	2	0	2
13.4.2 – Sensory Changes [Associated with Aging]	2	0	2
7.0 – Pharmacology	32	36	68
13.4.3 – Pharmacokinetic Changes [Associated with Aging]	2	0	2
13.4.4 – Polypharmacy [Associated with Aging]	2	0	2
8.0 – Airway Management, Respiration, and Artificial Ventilation	6	36	42
10.10 - Respiratory	12	0	12
10.8 - Cardiovascular	54	36	90
11.0 – Shock and Resuscitation (exclude 11.1.12)	0	36	36
10.0 – Medicine (exclude 10.1, 10.4, 10.8, 10.10, and 10.13)	72	0	72
12.0 – Trauma (exclude 12.2 and 12.9)	36	36	72
10.13 - Gynecology	12	12	24
13.0 – Special Patient Populations	12	12	24
12.9 – Special Considerations In Trauma	12	12	24
14.0 – EMS Operations	18	0	18
Capstone / NREMT Preparation	0	36	36
Total	**414**	**288**	**702**

It is recognized that state-approved EMS training centers have the ability to provide instruction using various educational methodologies (e.g. traditional classroom lecture, hybrid, online, open labs, interactive television, clinical/field partnerships, and simulation). Nothing within this curriculum document is intended to mandate minimum contact hours (didactic or lab) or to limit individual state-approved EMS training centers from employing various educational methodologies as they deem appropriate so long as the curriculum objectives contained herein are delivered.

The hours delineated above are general guidelines or recommendations, not mandates. Time associated with clinical and/or field experiences is in addition these hours.

0.6 – Clinical and Field Experiences, Minimum Hours and Competency Requirements

Wisconsin recognizes that the focus of Paramedic education is to produce safe, competent Paramedic providers. Clinical and field experiences are of tremendous importance in ensuring Paramedic students become safe field practitioners. With that being said, Wisconsin also recognizes that different students obtain minimal competence in various techniques and skills at different rates. Additionally, accumulating hours in clinical and field experiences does not guarantee an increased number of productive patient contact experiences as the EMS training centers cannot proactively generate live patient experiences at their affiliated clinical and field sites.

With that in mind, the following minimum competency guidelines are proposed as a part of this curriculum. So long as a Paramedic student successfully completes the Technical Skills Assessment (available through the Wisconsin Technical College System) and is determined to be competent in the competency categories denoted below by a state-approved EMS training center, the number of hours spent in clinical and field experiences is of diminished importance. Therefore, no specific minimum hours requirement for clinical and field experiences is mandated within this curriculum.

Clinical and field experiences should count toward the student's competency requirements only after the student demonstrates requisite competence in the didactic and laboratory components pertinent to the respective competency. Training centers may increase the minimum competency guidelines if necessary or desired given local needs.

In instances where "simulation" is denoted, such simulation need only be "low fidelity" (non-scenario based, skills check-off) and any applicable clinical, field, or HPS experiences over and above the minimum stipulated requirements for that category may be used to meet the simulation requirements for that category.

If HPS ("Human Patient Simulator") is denoted, up to one-half of the listed competency requirement may be obtained through scenario-based, high-fidelity simulation experiences. Before HPS experiences can be used in such fashion, the EMS training center must obtain prior approval by the DHS EMS Section.

Competency	Paramedic	I-to-P Transition
Venous Access The student must demonstrate the ability to gain venous access using the following routes:		
Intravenous	20 Clinical / Field / HPS	10 Clinical / Field / HPS
Intraosseous	3 Simulated	3 Simulated
Medication Administration The student must demonstrate the ability to safely perform all the steps of each procedure and properly administer medications using the following routes:		
IV-Bolus	10 Clinical / Field / HPS	5 Clinical / Field / HPS
IM	1 Simulated	1 Simulated

Competency	Paramedic	I-to-P Transition
Sub-Q	1 Simulated	1 Simulated
IM or Sub-Q	2 Clinical / Field / HPS	2 Clinical / Field / HPS
Intranasal	2 Simulated	2 Simulated
Nebulized Breathing Treatment Includes: hand-held, face mask, and in-line	1 Simulated 2 Clinical / Field / HPS	1 Simulated 2 Clinical / Field / HPS
Airway Management The student must demonstrate the ability to safely perform each of the following airway management procedures:		
Affirmative Airway Management	8 Clinical / Field / HPS	4 Clinical / Field / HPS
Endotracheal Intubation	7 Simulated (includes challenging intubations) 2 Clinical / Field (No HPS)	7 Simulated (includes challenging intubations) 2 Clinical / Field (No HPS)
Assessment and Treatment Plans The student must demonstrate the ability to perform a comprehensive patient assessment and participate in the formulation and implementation of a treatment plan for patients with the following complaints / conditions (only one category can be used for each individual patient):		
Cardiac	10 Clinical / Field / HPS	10 Clinical / Field / HPS
Respiratory	10 Clinical / Field / HPS	10 Clinical / Field / HPS
Neurological / ALOC	10 Clinical / Field / HPS	10 Clinical / Field / HPS
Abdominal / GI / GU	10 Clinical / Field / HPS	10 Clinical / Field / HPS
Trauma	10 Clinical / Field / HPS	10 Clinical / Field / HPS
Diabetic	4 Clinical / Field / HPS	4 Clinical / Field / HPS
Obstetric	4 Simulated	4 Simulated
Psychiatric	4 Simulated	4 Simulated
Pediatric Assessment and Treatment Plans The student must demonstrate the ability to perform a comprehensive patient assessment and participate in the formulation and implementation of a treatment plan for pediatric patients with one of the complaints or conditions listed above:		
Pediatric 17 years old or younger, from above list	14 Clinical / Field / HPS	10 Clinical / Field / HPS
Field Experiences The student must participate in various roles during actual paramedic-level ambulance service provider responses.		
Observation	10 Field / HPS	0
Team Member Team Member experiences over the minimum required may count toward "Observation" requirements.	20 Field / HPS	10 Field / HPS
Team Leader Team Leader experiences over the minimum required number may count toward "Team Member" or "Observation" requirements.	20 Field / HPS	20 Field / HPS

Definitions / Guidance:

Affirmative Airway Management

Airway management occurs when a student manages the airway of a patient who is unable to manage or maintain his or her own airway. Manual airway maneuvers, suctioning, insertion of non-visualized advanced airways (i.e., Combitube, King LTS-D), endotracheal intubation, or mechanical respirations via bag-valve-mask, pocket mask, or other approved ventilator device would constitute airway management if, without such interventions, the patient's own respirations would be inadequate or absent. Manual airway positioning or utilizing an oral or nasal airway, in and of itself, does not qualify as affirmative airway management unless accompanied with mechanical ventilatory support. Suctioning a conscious patient when secured to a long board does not constitute airway management. Administering supplemental oxygen, CPAP, or a nebulizer treatment is not considered affirmative airway management.

Cardiac

Cardiac complaints include symptomatic cardiac arrhythmias, pulseless-nonbreathers, and chest pain of suspected cardiac origin. Chest wall pain related to a traumatic injury or event would only be cardiac in nature if the assessment revealed potential injury to the patient's heart (i.e., pericardial tamponade, aortic dissection, etc.).

Respiratory

Respiratory complaints include shortness of breath, dyspnea on exertion, paroxysmal nocturnal dyspnea, COPD, pneumonia, asthma, pleuritic chest pain, or any time the patient's complain involves a respiratory component.

Neurological / ALOC

Neurological complaints include stroke, TIA, seizure, hypoglycemia (if not seeking credit for a diabetic assessment and treatment plan), alcohol intoxication (if there is no underlying psychological issue related to the intoxication), syncope, and acute confusion. A patient suffering from a decreased in their level of consciousness or a specific neurological compliant is a neurological / ALOC patient.

Abdominal / GI / GU

Abdominal / GI / GU complaints include nausea, vomiting, abdominal pain, kidney stones, hematemesis, menaturia, melena, or other abdominal / pelvic complaint not related to pregnancy.

Trauma

A trauma assessment and treatment plan encompasses the patient who was involved in an incident where a traumatic injury was sustained. Regardless of the severity of the traumatic injury, the student should consider the need for ALS interventions such as IV, medications, needle decompression, airway management, cricothyrotomy, or RSI.

Diabetic

A diabetic patient is one with an undiagnosed new onset of hyperglycemia, hypoglycemia, DKA, HHNK, or is a known diabetic suffering from complications related to his or her diabetes.

Obstetric

Obstetric patients are pregnant or perinatal (within one month postpartum) with complaints related to the pregnancy.

Psychiatric

A psychiatric patient suffers from a behavioral emergency, such as depression, suicidal ideation, suicide attempt, drug/alcohol addiction, or any other psychotic event. (A "typical" intoxicated patient does not qualify as a psychiatric patient.)

Pediatric
Pediatric patients are defined as 17 years of age or younger.

Team Leader
To function as and receive credit for being a team leader, the student must demonstrate the ability to perform a comprehensive assessment as well as both formulate and implement an appropriate treatment plan at the Paramedic level. The student must request evaluation for team leadership prior to arrival on scene to receive credit for a "Team Leader" patient contact. A student may receive "Team Member" credit if the Team Leader attempt is deemed to be inadequate by the preceptor.

Team Member
"Team Member" credit is awarded for field contacts where the student performs all or some of the Paramedic duties on a field patient contact. The expectation is that the student must demonstrate the ability to make patient care decisions based upon all elements gathered to form a general impression of the patient and a working diagnosis upon which to provide treatment. This category applies to the patient who receives an ALS evaluation in which critical thinking skills are utilized to gather, weigh, and synthesize patient information in order to formulate a diagnosis and treatment plan for the patient, even though the patient may be deemed stable for transport by a BLS unit.

Observation
Observation field experiences are designed for students to observe. Students should focus on learning where equipment is stored, what protocols are utilized, and how current-licensed Paramedics perform their duties without the pressure of performing patient care. This also provides time for the preceptor to acquire familiarity with the student.

0.7 – Medication List

The following medications are approved for use by Wisconsin-licensed paramedics at the time of approval of this curriculum and should be included in the initial instruction of paramedic students in conjunction with the subject matter associated with the administration of the respective medication:

- 0.45% sodium chloride
- 0.9% sodium chloride (Normal Saline)
- 10% dextrose
- 5% dextrose in 0.45% sodium chloride
- 5% dextrose in lactated ringer's
- 5% dextrose in water (D5W)
- Activated charcoal
- Adenosine (Adenocard)
- Albuterol
- Amiodarone (Cordarone)
- Aspirin
- Atropine
- Calcium chloride
- Clopidogogrel (Plavix) – Oral only
- Cyanide antidote package (Cyanokit)
    - Amyl nitrate
    - Sodium nitrate
    - Sodium thiosulfate
- Dexamethasone (Decadron)
- Dextrose (50%, 25%, 10%)
- Diazepam (Valium)
- Diltiazem (Cardizem)
- Diphenhydramine (Benadryl)
- Dopamine
- Epinephrine

- Etomadate (Amidate)
- Famotidine (Pepcid)
- Fentanyl (Sublimaze)
- Flumazenil (Romazicon)
- Furosemide (Lasix)
- Glucagon
- Glucose
- Haloperidol (Haldol)
- Heparin – Bolus only
- Hydromorphone (Dilaudid)
- Ipratropium (Atrovent)
- Ketamine (Ketalar)
- Ketorolac (Toradol)
- Lactated ringer's
- Levalbuterol (Xopenex)
- Lidocaine (Xylocaine)
- Lorazepam (Ativan)
- Magnesium sulfate
- Mark I kit
    - Pralidoxime (2-Pam Chloride)
    - Atropine
- Mark V kit
    - Pralidoxime (2-Pam Chloride)
    - Atropine
    - Diazepam (Valium)
- Methylprednisolone (Solu-Medrol)
- Metoclopramide (Reglan)
- Metoprolol (Lopressor)
- Midazolam (Versed)
- Morphine
- Nalbuphine (Nubian)
- Naloxone (Narcan)
- Nitroglycerin
    - Paste
    - Spray
    - Tablets
    - Drip – With pump only
- Nitrous oxide
- Ondansetron (Zofran)
- Oxygen
- Oxytocin (Pitocin)
- Pancuronium (Pavulon)
- Procainamide
- Prochlorperazine (Compazine)
- Rocuronium (Zemuron)
- Sodium bicarbonate
- Succinylcholine (Anectine)
- Terbutaline
- Vasopressin (Pitressin)
- Vecuronium (Norcuron)
- Ziprasidone (Geodon)

1.0 – Preparatory

Integrates comprehensive knowledge of EMS systems, safety/well-being of the paramedic, and medical/legal and ethical issues, which is intended to improve the health of EMS personnel, patients, and the community.

1.1 – EMS Systems

Objective	Educational Standard
1.1.1 – History of EMS	
C 1.1.1.1 – Describe key historical events that influenced the national development of Emergency Medical Services (EMS) systems.	1. EMS prior to World War I a. 1485 – Siege of Malaga (first recorded use of ambulance by military, no medical care provided) b. 1800s – Napoleon designated vehicle and attendant to head to battle field i. 1860 – First recorded use of medic and ambulance use in the United States ii. 1865 – First civilian ambulance (Commercial Hospital of Cincinnati, Ohio) iii. 1869 – First ambulance service (Bellevue Hospital in New York, NY) iv. 1899 – Michael Reese Hospital in Chicago operates automobile ambulance 2. EMS Between World War I and II a. 1900s – Hospitals place interns on ambulances (first real attempt at quality scene and transport care) b. 1926 – Phoenix Fire Department enters EMS c. 1928 – First rescue squad launched in Roanoke, VA (implemented by Julien Stanley Wise and named Roanoke Life Saving Crew) d. 1940s i. Many hospital-based ambulance services shut down due to lack of manpower resulting from WW I ii. City governments turn service over to police and fire departments iii. No laws on minimum training iv. Ambulance attendance became a form of punishment in many fire departments 3. Post-World War II a. 1950s i. 1951 – Helicopters used during Korean War ii. 1956 – Mouth-to-mouth resuscitation developed by Dr. Elan and Dr. Safar iii. 1959 – First portable defibrillator developed at Johns Hopkins Hospital b. 1960s i. 1960 – LAFD puts medical personnel on

every engine, ladder, and rescue company

ii. 1965 – "Accidental Death & Disability: The Neglected Disease of Modern Society" or The White Paper
   1. Lack of uniform laws and standards
   2. Ambulances and equipment of poor quality
   3. Communication lacking between EMS and hospital
   4. Training of personnel lacking
   5. Hospitals used part-time staff in ED
   6. More people died in automobile accidents than in Vietnam War

iii. 1966
   1. EMS Guidelines – Highway Safety Act, Standard 11
   2. Delivery of pre-hospital care using ambulances by Dr. Frank Pantridge in Belfast, Ireland

iv. 1967 – AAOS creates "Emergency Care and Transportation of the Sick and Injured" (first textbook for EMS personnel)

v. 1968
   1. Task Force of the Committee of EMS drafts basic training standards, resulting in "Training of Ambulance Personnel and Others Responsible for Emergency Care of the Sick and Injured at the Scene and During Transport" by Dunlop and Associates
   2. American Telephone and Telegraph reserves 9-1-1 for emergency use

vi. 1969
   1. Dr. Eugene Nagel launces Nation's first Paramedic program in Miami.
   2. The Committee on Ambulance Design Criteria published "Medical Requirements for Ambulance Design and Equipment"

c. 1970s

i. 1970
   1. Use of helicopters in EMS explored
   2. National Registry of Emergency Medical Technicians established

ii. 1971 – The Committee on Injuries of the AAOS hosts national workshop on training for EMTs

iii. 1972
   1. Department of Health, Education and Welfare directed by President Nixon to develop new ways to organize EMS

	2. Departments of Defense and Transportation form helicopter evacuation service 3. TV show "Emergency!" begins eight-year run iv. 1973 1. EMS Systems Act of 1973 passed 2. Star of Life developed by DOT 3. St. Anthony's Hospital in Denver starts Nation's first civilian aeromedical transport service v. 1974 – 1979 1. 1974 a. Department of Health, Education and Welfare published guidelines for developing and implementing EMS systems b. Federal report discloses that less than half of ambulance personnel completed DOT 81-hour course 2. 1975 a. American Medical Association recognizes Emergency Medicine as a specialty b. University of Pittsburgh and Nancy Caroline, M.D. awarded contract for first EMT-Paramedic National Standard Curriculum c. National Association of EMTs is formed d. 1980s i. 1983 – The EMS for Children Act is passed ii. 1985 – National Association of EMS Physicians formed e. 1990s i. 1990 – The Trauma Care System Planning and Development Act is passed ii. 1991- The Commission on Accreditation of Ambulance Services sets standards and benchmarks for ambulance services
1.1.2 – EMS Systems	
C 1.1.2.1 – Identify the components of an EMS system.	1. Manpower (levels of EMS licensure) 2. Education and training (National EMS Education Agenda for the Future: A Systems Approach) a. National EMS Scope of Practice Model b. National EMS Education Standards c. National EMS Education Program Accreditation d. National EMS Certification 3. Communications

	4. Transportation 5. Facilities 6. Critical care units 7. Use of public safety agencies 8. Consumer participation 9. Accessibility of care 10. Transfer of patients (integration with other professionals and continuity of care) a. Medical personnel b. Law enforcement c. Emergency management d. Home healthcare providers e. Other responders 11. Standardized medical record-keeping 12. Patients' information and education a. Patient education i. Pre-incident ii. Post-incident b. Public education i. Role modeling ii. Community involvement iii. Leader activities iv. Community activities v. Prevention activities 13. Independent review and evaluation 14. Disaster linkage 15. Mutual aid agreements
C 1.1.2.2 – Describe the EMS chain of survival.	1. Bystander care 2. Dispatch 3. Response 4. Pre-hospital care 5. Transportation 6. Emergency department care 7. Definitive care 8. Rehabilitation
C 1.1.2.3 – Define various types of EMS services.	1. Fire-based 2. Third service 3. Private (for profit and nonprofit) 4. Hospital-based 5. Hybrid/other
C 1.1.2.4 – Discuss the relationship between EMS and the state trauma system.	(WI) State Trauma System (ss. 256.25)
C 1.1.2.5 – Discuss the role of the EMS physician.	1. Role of the EMS physician in providing medical direction a. Education and training of personnel b. Participation in personnel selection process c. Participation in equipment selection d. Development of clinical protocols e. Participate in quality improvement and problem resolution f. Provides direct input into patient care g. Interfaces between EMS providers and other health care agencies h. Advocacy within the medical community

	i. Serve as the "medical conscience" of the EMS system (advocate for quality patient care) 2. Types of medical direction a. On-line/direct b. Off-line/indirect 3. Benefits of medical direction a. On-line b. Off-line i. Prospective ii. Retrospective
1.1.3 – Roles / Responsibilities / Professionalism of EMS Personnel	
C 1.1.3.1 – Describe the roles and responsibilities (attributes) of a paramedic as a health care professional.	N/A
C 1.1.3.2 – Describe the leadership/affective characteristics of a paramedic.	1. Attributes of professional a. Integrity b. Empathy c. Self-motivation d. Appearance and personal hygiene 2. Confidence in skills and ability 3. Communication a. Verbal b. Written 4. Time management 5. Teamwork and diplomacy 6. Respect for patients, co-workers, and other healthcare professionals 7. Patient advocacy 8. Careful delivery of service
C 1.1.3.3 – Describe the administrative duties performed by a paramedic.	1. Record keeping and reporting 2. Special project and coordination and implementation 3. Station duties 4. Interagency relationships/partnerships
C 1.1.3.4 – Describe the mechanisms by which paramedics are credentialed as health care professionals.	1. Licensure 2. Certification 3. National registration 4. Reciprocity 5. Maintenance of certification and licensure a. Personal responsibility b. Continuing education c. Skill competency verification d. Criminal implications e. Fees
C 1.1.3.5 – List less traditional roles filled by paramedics.	1. Expanded scope of practice 2. Paramedics in other settings a. Emergency departments b. Clinics c. Health departments d. Physicians office e. Interfacility transport f. Critical care transport

	g. Neonatal transport h. High-risk obstetric transport
C 1.1.3.6 – List the operational responsibilities of paramedics.	1. Preparation 2. Response 3. Scene assessment 4. Patient assessment 5. Management a. Following protocols b. Interacting with medical direction physician, as needed 6. Appropriate disposition a. Disposition issues i. ED transport ii. Alternative destinations iii. Ground iv. Air v. Selection of the proper receiving facility vi. Requires knowledge of the receiving facilities vii. Hospital designation / categorization viii. Based on hospital resource capabilities ix. Clinical capabilities and specialty availability x. Transfer agreements xi. Payers and insurance systems b. Non-Transport i. Against medical advice ii. No assistance needed iii. Transfer to other EMS iv. Medical examiner investigations 7. Transfer of care 8. Documentation 9. Returning to service
C 1.1.3.7 – Describe the role of education in defining paramedics as healthcare professionals.	1. Education principles and practices a. National EMS Scope of Practice Model b. National EMS Education Standards 2. Paramedic education/accreditation a. National EMS Program Accreditation b. State accreditation 3. Patient education a. Pre-incident b. Post-incident 4. Public education a. Role modeling b. Community involvement c. Leader activities d. Community activities e. Prevention activities 5. Episodic/non-acute care activities a. Patient home assistance b. Social assistance c. Home health care assistance
C 1.1.3.8 – Define professionalism as it applies to the paramedic.	1. Profession 2. Specialized body of knowledge or expertise

	a. Self-regulating b. Maintains standards 3. Professionals a. Education b. Follow standards of conduct and performance c. Adhere to code of ethics 4. Health care professional a. Conforms to the standards of healthcare professions b. Provides quality patient care c. Instills pride in the profession d. Strives for high standards e. Earns respect of others f. High societal expectations while on- and off-duty g. EMS personnel occupy positions of public trust h. Unprofessional conduct i. Commitment to excellence j. Image and behavior k. Paramedics represent a variety of people i. Self ii. EMS agency iii. State/county/district EMS offices iv. Peers
C 1.1.3.9 – List affective characteristics of paramedics.	1. Integrity 2. Empathy 3. Self-motivation 4. Appearance and hygiene 5. Self-confidence 6. Time management 7. Communication a. Verbal b. Written 8. Teamwork and diplomacy 9. Respect for patients, co-workers, and other healthcare professionals 10. Patient advocacy 11. Careful delivery of service
A 1.1.3.10 – Plan for emergencies and the delivery of paramedic services.	N/A
P 1.1.3.11 – Maintain EMS vehicles and equipment.	N/A
A 1.1.3.12 – Apply integrity to the position.	N/A
A 1.1.3.13 – Demonstrate empathy with patients.	N/A
A 1.1.3.14 – Assume responsibility for motivation of self and others.	N/A
A 1.1.3.15 – Maintain professional appearance and personal hygiene.	N/A
A 1.1.3.16 – Demonstrate self-confidence.	N/A
A 1.1.3.17 – Manage time effectively.	N/A

A 1.1.3.18 – Demonstrate career development skills.	N/A
A 1.1.3.19 – Demonstrate leadership.	N/A
A 1.1.3.20 – Work effectively in a team (with diplomacy).	N/A
A 1.1.3.21 – Exhibit respect in diverse settings.	N/A
A 1.1.3.22 – Serve as a patient advocate.	N/A
A 1.1.3.23 – Deliver careful service.	N/A
1.1.4 – Quality Improvement	
C 1.1.4.1 – Define quality improvement in the EMS environment.	System for continually evaluating and improving care
C 1.1.4.2 – Describe the contribution of continuous quality improvement (CQI) to EMS.	Dynamic process
1.1.5 – Patient Safety	
C 1.1.5.1 – Recognize significance of patient safety to EMS.	One of the most urgent health care challenges
C 1.1.5.2 – Discuss incidence of medical errors.	IoM report "To Err is Human" up to 98,000 patients die due to medical errors
C 1.1.5.3 – List high-risk EMS activities affecting patient safety.	1. Hand-off 2. Communication issues 3. Medication issues 4. Airway issues 5. Dropping patients 6. Ambulance crashes 7. Spinal immobilization
C 1.1.5.4 – Describe how medical errors happen.	1. Skills-based failure 2. Rules-based failure 3. Knowledge-based failure
C 1.1.5.5 – Describe ways to prevent medical errors.	1. Environmental a. Clear protocols b. Light c. Minimal interruptions d. Organization and packaging of drugs 2. Individual a. Reflection in action b. Constantly question assumptions c. Reflection bias d. Use decision aids e. Ask for help

1.2 – Research

Objective	Educational Standard
1.2.1 – Research Principles to Interpret Literature and Advocate Evidence-Based Practice	
C 1.2.1.1 – Discuss medical research (introductory).	1. Overview of research methodology 2. Peer reviewed versus other publications 3. Critically reviewing research articles 4. Conceptual framework 5. Limitations of research
C 1.2.1.2 – Recognize importance of research in EMS.	1. Outcomes-based research 2. New procedures medications, and treatments 3. Quality assurance 4. Improved patient outcomes 5. Professionalism 6. Evidence-based medicine
C 1.2.1.3 – Define types of research.	1. Quantitative a. Experimental b. Non-experimental c. Survey research 2. Qualitative a. Characteristics b. Data collection methods c. Types of qualitative research d. Data analysis i. Summarizing ii. Interpreting
C 1.2.1.4 – Describe ethical considerations in research.	1. Human research subject protection a. Uncoerced and voluntary participation b. Subjects must be fully informed of the risks and benefits c. Subjects must consent to participation d. Subjects have the right to withdraw anytime 2. Role of Institutional Review Board (IRB) 3. Conflicts of interest 4. Accurate data reporting 5. Office of Human Research Protections 6. Food and Drug Administration
C 1.2.1.5 – Discuss literature review.	1. Role in research 2. Reference sources a. Peer reviewed literature b. Government sources c. Online literature search engines
C 1.2.1.6 – Define statistical concepts related to research.	1. Descriptive statistics 2. Inferential statistics 3. Sampling a. Population b. Parameter c. Sample d. Polling e. Sampling error 4. Statistical significance
C 1.2.1.7 – Relate research concepts to EMS.	1. National EMS Research Agenda

	2. Developing researchers 3. Higher education institutions 4. Research domains a. Clinical b. Systems c. Education 5. Evidence-based research (research into practice) 6. Clinical studies (improvement in patient outcomes) 7. Educational studies 8. Collaborative efforts 9. Funding a. Public funding b. Corporate support c. Foundation support d. Federal Government 10. Advancement of profession 11. Research consortia 12. Patient databases/data collection a. Hospitals b. EMS agencies c. Linking data 13. Joining with hospitals 14. Regulatory issues a. Waiver of informed consent in emergency circumstances b. Health Insurance Portability and Accountability Act ("HIPAA") c. National assurance program 15. Establishing a research agenda / adherence to research agenda
C 1.2.1.8 – Discuss evidence-based decision making.	1. Traditional medical practice is based on: a. Medical knowledge b. Intuition c. Judgment 2. High-quality patient care should focus on procedures proven useful in improving patient outcomes 3. The challenge for EMS is the relative lack of pre-hospital research 4. Evidence-based decision-making technique a. Formulate a question about appropriate treatments b. Search medical literature for related research c. Appraise evidence for validity and reliability d. If evidence supports a change in practice, adopt the new therapy allowing for unique patient needs

1.3 – Workforce Safety and Wellness

Objective	Educational Standard
1.3.1 – Provider Safety and Well-Being	
C 1.3.1.1 – Discuss the concepts of safety and wellness as they apply to the paramedic.	N/A
1.3.2 – Standard Safety Precautions	
C 1.3.2.1 – Identify standard EMS safety precautions.	1. Handwashing 2. Adherence to standard precautions / OSHA regulations 3. Safe operation of EMS / patient care equipment 4. Environmental control 5. Occupational health and bloodborne pathogens a. Immunizations b. Sharps
1.3.3 – Personal Protective Equipment	
C 1.3.3.1 – Describe the equipment available in a variety of adverse situations for self-protection, including body substance isolation steps for protection from airborne and bloodborne pathogens.	N/A
1.3.4 – Stress Management	
C 1.3.4.1 – Describe the three phases of the stress response, factors that trigger the stress response, and causes of stress in EMS.	1. Acute stress reaction 2. Delayed stress reaction 3. Cumulative stress reaction
C 1.3.4.2 – Describe the defense mechanisms and management techniques commonly used to deal with stress.	1. Change in lifestyle 2. Balance in life 3. Recognize response to family and friends 4. Change in work environment 5. Seek professional assistance
C 1.3.4.3 – Describe the stages of the grieving process and the unique challenges for paramedics in dealing with themselves, adults, children, and other special populations related to their understanding of death and dying.	1. Denial 2. Anger 3. Bargaining 4. Depression 5. Acceptance
1.3.5 – Prevention of Work-Related Injuries	
C 1.3.5.1 – Identify ways to prevent EMS work-related injuries.	1. Vehicle restraint systems 2. Safe lifting techniques 3. Adequate sleep 4. Physical fitness and nutrition 5. Hazard awareness 6. Adherence to standard precautions / OSHA regulations 7. Disease transmission prevention (communicable versus bloodborne)
1.3.6 – Lifting and Moving Patients	
C 1.3.6.1 – Differentiate proper from improper body mechanics for lifting and moving patients in emergency and nonemergency situations.	1. Lifting techniques a. Safety precautions b. Guidelines for lifting 2. Safe lifting of cots and stretchers

	3. Power lift or squat lift position 4. Power grip 5. Back-in locked-in position 6. Carrying a. Precautions for carrying b. Guidelines for carrying c. Correct carrying procedure d. One-handed carrying technique e. Correct carrying procedure on stairs 7. Reaching a. Guidelines for reaching b. Application of reaching techniques c. Correct reaching for log rolls 8. Pushing and pulling guidelines 9. Emergency move a. Indications i. Fire or danger of fire ii. Explosives or other hazardous materials iii. Other hazards at the scene iv. To gain access to other patients in a vehicle who need life-saving care v. Patient's location or position, e.g., a cardiac arrest patient sitting in a chair or lying on a bed b. Technique 10. Urgent move a. Indications i. Altered mental status ii. Inadequate breathing iii. Shock (hypoperfusion) b. Technique 11. Non-urgent moves – indication a. Direct ground lift (no suspected spine injury) b. Extremity lift (no suspected extremity or back injuries) 12. Transfer of spine patient from bed to stretcher a. Direct carry b. Draw sheet method
1.3.7 – Equipment	
C 1.3.7.1 – Describe types and use of patient movement equipment.	1. Stretchers/cots a. Types i. Wheeled stretcher ii. Portable stretcher iii. Stair chair iv. Bariatric stretcher b. Standard 2. Tracked systems a. Backboards i. Long 1. Scoop or orthopedic stretcher 2. Flexible stretcher ii. Short 1. Traditional wooden device 2. Vest type device

	b. Bariatric stretcher i. Pneumatic or electronic stretchers ii. Neonatal isoletes 3. Maintenance – follow manufacturer's directions for inspection, cleaning, repair, and upkeep 4. Patient positioning a. Unresponsive patient without suspected spine injury b. A patient with chest pain or discomfort or difficulty breathing c. A patient with suspected spine injury d. Pregnant patient with hypotension e. A patient who is nauseated or vomiting 5. Bariatric patients a. Patient size b. Specialized equipment i. Stretchers ii. Ambulances 1. Ramps 2. Winches iii. Personnel considerations
1.3.8 – Disease Transmission	
C 1.3.8.1 – Identify means of disease transmission and precautions to prevent such transmission.	N/A
1.3.9 – Wellness Principles	
C 1.3.9.1 – Discuss wellness principles employed to enhance the physical and mental wellbeing of the paramedic.	1. Physical wellbeing a. Physical fitness i. Cardiovascular endurance ii. Muscle strength iii. Muscle flexibility b. Sleep c. Disease prevention d. Injury prevention 2. Mental wellbeing a. Alcohol and drug issues b. Smoking cessation c. Stress management d. Relationship issues

1.4 – Documentation

Objective	Educational Standard
1.4.1 – Principles of Medical Documentation and Report Writing	
C 1.4.1.1 – Identify minimum data to be included on a patient care report.	1. Patient information gathered by the paramedic 2. Administrative information / response information
C 1.4.1.2 – Identify the general principles regarding the importance of EMS documentation and ways in which such documents are used.	1. Functions 2. Uses a. Types b. Sections 3. Special considerations a. Confidentiality b. Distribution c. Health Information Portability and Accountability Act of 1996 (“HIPAA”)
C 1.4.1.3 – Describe the potential consequences of illegible, incomplete, or inaccurate documentation.	1. Willful falsification – consequences 2. Errors a. During documentation b. After submission c. Electronic
C 1.4.1.4 – Describe the special documentation considerations concerning patient refusal of care and/or transport.	1. Establishing competence 2. Documenting competence 3. Documenting partial, incomplete, or refused assessment 4. Documentation of the complete, incomplete, or refused care
C 1.4.1.5 – Describe the special considerations concerning mass casualty incidents or other unique reports.	1. Multiple casualty incidents (“MCI”) 2. Special reports a. Interagency b. Legal reporting c. Exposure d. Injury e. Interfacility transfer (including reason for transfer)
P 1.4.1.6 – Demonstrate proper completion of a typical patient care report.	1. Treatment prior to arrival 2. Full assessment 3. Treatment provided enroute a. Scheduled b. Unanticipated 4. Condition on arrival a. Reading a patient record b. Narrative styles i. Body systems documentation ii. Body parts documentation iii. Documenting the clinical impression / working diagnosis iv. Documenting the treatment and response v. Documenting transfer of patient care
P 1.4.1.7 – Write legibly.	N/A
P 1.4.1.8 – Document communication accurately and concisely	N/A

P 1.4.1.9 – Use grammar and punctuation correctly.	N/A
P 1.4.1.10 – Use electronic resources and information technology (i.e., WARDS).	N/A

1.5 – EMS System Communication

Objective	Educational Standard
1.5.1 – EMS Communication System	
C 1.5.1.1 – Identify EMS communication system components.	1. Base station 2. Mobile radios (transmitter/receivers) a. Vehicular mounted device b. Mobile transmitters usually transmit at lower power than base stations (typically 20 to 50 watts) c. Typical transmission range is 10 to 15 miles over average terrain 3. Portable radios (transmitter/receivers) a. Handheld device b. Typically have power output of one to five watts, limiting their range 4. Repeater/base station 5. Digital radio equipment 6. Cellular telephones
C 1.5.1.2 – Describe proper radio communications between EMS providers and dispatch.	1. Radio frequencies 2. Response to scene a. The dispatcher needs to be notified that the call was received b. Dispatch needs to know that the unit is en route 3. Arrival at the scene (dispatcher must be notified) 4. Depart the scene a. Dispatcher must be notified b. Prolonged on scene times with absence of communications 5. Arrival at the receiving facility or rendezvous point (dispatcher must be notified) 6. Arrival for service after patient transfer (dispatcher must be notified)
1.5.2 – Communicating with Other Health Care Professionals	
C 1.5.2.1 – Explain factors related to effective communications with medical control.	1. Medical control is at the receiving facility; medical control is at a separate site 2. Paramedics may need to contact medical control for consultation and to obtain orders for administration of medications 3. Paramedics must be accurate 4. After receiving an order for a medication or procedure, repeat the order back word-for-word 5. Orders that are unclear or appear to be inappropriate should be questioned or clarified for the paramedic
C 1.5.2.2 – Explain the importance of proper communication with receiving facilities.	1. Patient reporting concepts 2. Arrival at the hospital 3. Leaving the hospital for the station
C 1.5.2.3 – Describe principles of communication system maintenance.	1. Radio checks 2. Planning for failures
C 1.5.2.4 – Identify current and emerging	Phone/wireless communications

technology used to collect and exchange patient and/or scene information electronically.	
1.5.3 – Team Communication and Dynamics	
C 1.5.3.1 – Identify the components of interpersonal communication transmission.	1. Source a. Medium b. Common symbols c. Clear format i. Written ii. Verbal iii. Other symbols 2. Encoding 3. Message 4. Decoding 5. Receiver 6. Feedback

1.6 – Therapeutic Communication

Objective	Educational Standard
1.6.1 – Principles of Communicating with Patients in a Manner that Achieves a Positive Relationship	
C 1.6.1.1 – Identify strategies for developing rapport with the patient.	1. The paramedic should self-introduce at the start of any conversation 2. Make and keep eye contact 3. When practical, position yourself at a level lower than the patient or on the same level 4. Be honest with the patient 5. Use language the patient can understand and avoid medical jargon 6. Be aware of your own body language 7. Speak calmly, clearly, slowly, and distinctly 8. Use the patient's proper name, either first or last, depending on the circumstances 9. If a patient has difficult hearing, speak clearly with lips visible 10. Allow the patient enough time to answer a question before asking the next one 11. Act and speak in a calm, confident manner
C 1.6.1.2 – Identify internal and external factors that affect an interview.	1. Be positioned to address special populations, such as hear impaired, non-English speaking populations, and use of interpreters 2. Internal factors for effective communication a. Accepting others as people b. Empathy c. Be a good listener d. Introduction i. Self ii. Partners/team iii. Patient introduction 3. Eternal factors for effective communication a. Privacy b. Interruptions c. Physical environment i. Lighting ii. Noises and outside interference iii. Distracting equipment iv. Distance v. Equal seating – eye level d. Dress 4. Note-taking
C 1.6.1.3 – Describe effective interviewing techniques and interactions.	1. Types of questions used in interviewing a. Open-ended questions b. Closed or direct questions c. One question at a time d. Chose language the patient understands 2. Types of responses a. Facilitation b. Silence c. Reflection

d. Empathy
e. Clarification
f. Confrontation
g. Interpretation
h. Explanation
i. Summary

3. Traps of interviewing
   a. Providing false assurance or reassurance
   b. Giving advice
   c. Authority
   d. Using avoidance language
   e. Distancing
   f. Professional jargon
   g. Leading or biased questions
   h. Talking too much
   i. Interrupting
   j. Using "why" questions
4. Nonverbal skills
   a. Physical appearance
      i. Interviewer
      ii. Patient
   b. Posture and gestures
      i. Interviewer
      ii. Patient
      iii. Gestures
      iv. Facial expressions
      v. Eye contact
      vi. Voice
      vii. Touch
5. Developing patient rapport – Put the patient and yourself at ease
6. Strategies to ascertain information
   a. Patients generally communicate in three ways
   b. Obtaining information on complaints
      i. Resistance
      ii. Shifting focus
      iii. Defense mechanisms
      iv. Distraction
7. Methods to assess mental status during the interview
   a. Observation
   b. Conversation
      i. Orientation
      ii. Speech
      iii. Thinking
      iv. Attention
      v. Concentration
      vi. Comprehension
      vii. Remote, recent, and immediate memory
      viii. Affect
      ix. Autonomic responses
      x. Facial movements
      xi. Reactive movements
      xii. Grooming movements

	8. Exploration is a method to review the patient's internal experiences a. Mood b. Energy level c. Content of thinking
C 1.6.1.4 – Discuss strategies for interviewing difficult patients (not motivated to talk).	1. Most patients are more than willing to talk 2. Difficult interviews 3. Techniques to use a. Start the interview in the normal manner b. Attempt to use open-ended questions c. Provide positive feedback d. Make sure the patient understands the questions e. Continue to ask questions 4. Interviewing a hostile patient 5. Hearing impaired patients 6. Patients under the influence of street drugs or alcohol 7. Sexually aggressive patient
C 1.6.1.5 – Define unique interviewing techniques for patients with special needs.	1. Age a. Infants b. Preschoolers c. School-age children i. Use parent and caregiver ii. Clear explanations iii. Be honest d. Adolescents e. Adults f. Geriatrics i. Potential for visual deficit ii. Potential for auditory deficit iii. Obtain glasses and hearing aid 2. Stage of development 3. Patients with special needs 4. Differing cultures a. Enormous diversity in populations of all cultures b. Diversity (a term once used primarily to describe "racial awareness") now refers to differences of any king: race, class, religion, gender, sexual preference, personal habitat, and physical ability c. Good health care depends on sensitivity toward these differences d. Experiences of health and illness vary widely because of different beliefs, behaviors, and past experiences, and may conflict with the paramedic's learned medical practice e. By revealing awareness of cultural issues, the paramedic will convey interest, concern, and respect f. When dealing with patients from different cultures, remember the following key points: i. Individual is the "foreground," the

culture is the "background"
ii. Different generations and individuals within the same family may have different sets of beliefs.
iii. Not all people identify with their ethnic cultural background
iv. All people share common problems or situations
v. Respect the integrity of cultural beliefs
vi. Realize that people may not share your explanations of the causes of their ill health, but may accept conventional treatments
vii. You do not have to agree with every aspect of another's culture, nor does the person have to accept everything about your for effective and culturally sensitive health care to occur
viii. Recognize your personal cultural assumptions, prejudices, and belief systems and do not let them interfere with patient care
ix. Introduce yourself and the way in which you want to be called
x. Both the paramedic and the patient will bring cultural stereotypes to a professional relationship
xi. Ethnocentrism
xii. Cultural imposition
xiii. Space
    1. Intimate zone
    2. Personal distance
    3. Social distance
    4. Public distance
xiv. Cultural issues
    1. Variety of space
    2. Accept the sick role in different ways
    3. Nonverbal communication may be perceived differently
    4. Asian, Native Americans, Indochinese, and Arabs may consider direct eye contact impolite or aggressive
    5. Touch
    6. Language barrier
xv. Special considerations
    1. Regardless of the patient's cultural background, educational status, occupation, or ability to speak English, most patients will be anxious during an emergency event
    2. Attempt to communicate in English first to determine whether the patient understands or speaks some English words or phrases

		3. Bystanders, coworkers, or family members may be available to provide assistance 4. If the patient does not speak or understand English, attempt to communicate with signs or gestures 5. Notify the receiving hospital as soon as possible to arrange for an interpreter 6. If time permits, all assessment procedures should be performed slowly and with the patient's permission 7. Be aware that "private space" is culturally defined 8. Pointing to the areas of the body to be examined before touching the patient is best xvi. Respect the patient's need for modesty and privacy at the scene and during transport
P 1.6.1.6 – Speak clearly.	N/A	
A 1.6.1.7 – Listen actively.	N/A	
A 1.6.1.8 – Adjust communication strategies based on the situation.	N/A	
A 1.6.1.9 – Select vocabulary appropriate to the audience.	N/A	

1.7 – Medical/Legal and Ethics

Objective	Educational Standard
1.7.1 – Consent/Refusal of Care	
C 1.7.1.1 – Define consent to care.	1. Nature of illness 2. Treatment recommendations 3. Risks and refusals 4. Alternatives
C 1.7.1.2 – Define types of consent.	1. Expressed consent (non-verbal) 2. Informed consent (research) 3. Implied consent (emergency doctrine) and incapacitation a. Physical b. Mental 4. Involuntary consent a. Mental health b. Incarceration 5. Minors a. Parental permission and In loco Parentis emergency doctrines b. Emancipation i. Married ii. Armed services iii. Independence (court decree) iv. (WI) Rare occurrence, usually after the fact by court decision; not statutorily defined 6. Medical restraint and use of force doctrine a. Reasonable prevention of harm i. Suicide ii. Homicide iii. (WI) Chapter 55 b. Non-punitive 7. Legal complications related to consent a. Abandonment b. False imprisonment c. Assault d. Battery
C 1.7.1.3 – Describe refusal of care and/or transportation.	1. Patient must be alert and oriented to person, place, and time 2. Patient must be informed of the risks of refusing care (e.g., death) 3. Patient must be informed if problems return / persist they should call EMS 4. Against medical advice a. Due diligence i. Standard of care ii. Medical control b. Documentation
1.7.2 – Confidentiality	
C 1.7.2.1 – Discuss the obligation to protect patient information.	N/A
C 1.7.2.2 – Discuss HIPAA, its provisions, and its applicability/impact on EMS.	N/A

C 1.7.2.3 – Discuss confidentiality arising from the physician-patient relationship.	1. Assessment findings 2. Treatments rendered 3. (WI) Physician-patient relationship not imbued to paramedic
C 1.7.2.4 – Describe privileged communications.	1. Need to know (healthcare providers) 2. Education 3. Legally mandated a. Child abuse reported b. Subpoena 4. Third-party billing 5. Release of medical information
C 1.7.2.5 – Explain possible repercussions for a breach of confidentiality.	1. Libel 2. Slander
A 1.7.2.6 – Demonstrate HIPAA compliance.	N/A
A 1.7.2.7 – Demonstrate confidentiality.	N/A
1.7.3 – Advanced Directives	
C 1.7.3.1 – Explain advanced directives and how they impact patient care.	1. Patient Self-Determination Act a. Do not resuscitate (DNR) b. Living wills c. Durable power of attorney 2. (WI) Equivalent provisions
1.7.4 – Tort and Criminal Actions	
C 1.7.4.1 – Describe basic legal concepts regarding the United Stated judiciary system.	1. Origins of jurisprudence (common law) 2. Source of constitutional law a. Legislative i. Statutes ii. Regulations b. Administrative – Regulatory policy 3. The legal process – Role of courts a. Court of original jurisdiction (trial by judge or jury) b. Appeals and precedents 4. Elements of a civil lawsuit a. Actionable cause b. Complaint c. Investigation (discovery) i. Dispositions ii. Interrogatories d. Trial i. Decision ii. Settlement e. Appeal 5. Slander 6. Libel
C 1.7.4.2 – Describe specific crimes and their associated elements as related to EMS.	1. Breaches of conduct a. Assault b. Battery c. Kidnapping 2. Mandatory reporting requirements a. Abuse and assault i. Child abuse (neglect) ii. Elder abuse iii. Domestic violence

	b. Criminality i. Sexual assault ii. Penetrating trauma 1. Gunshot 2. Stab wounds c. Communicable diseases i. Reportable ii. Animal bites
C 1.7.4.3 – Describe the elements of negligence, possible defenses to a claim, and potential limitations to civil liability.	1. Concept of negligence a. Res ipsa loquitur b. Negligence per se 2. Elements of negligence a. Duty to act i. Contractual ii. Duty undertaken b. Breach of duty i. Standard of care ii. Commission 1. Malfeasance 2. Misfeasance iii. Omission (nonfeasance) iv. False imprisonment v. Wrongful death vi. Abandonment c. Proximate causation d. Damages to plaintiff i. Physical (e.g., lost earnings) ii. Psychological (e.g., pain and suffering) iii. Punitive e. Defenses i. Good Samaritan ii. Governmental immunity iii. Statute of limitations iv. Contributory/comparative negligence f. Protection from liability i. Professionalism ii. Standard of care iii. Liability insurance
1.7.5 – Statutory Responsibilities	
C 1.7.5.1 – Discuss the Medical Practice Act.	1. Physician responsibilities (competency assurance) a. Mandatory training b. Skill competency c. Run review 2. Liability of the paramedic medical director a. On-line (direct supervision) b. Off-line (protocols with standing orders under indirect supervision) 3. Borrowed servant doctrine (liability for actions of EMTs supervised by the paramedic)
C 1.7.5.2 – Discuss the legal implications of medical direction.	N/A
C 1.7.5.3 – Describe statutory duty to act.	1. Good Samaritan 2. Abandonment

A 1.7.5.4 – Practice within legal boundaries/requirements.	N/A
1.7.6 – Mandatory Reporting	
C 1.7.6.1 – Identify when paramedics are legally compelled to notify the authorities.	1. Abuse 2. Neglect
C 1.7.6.2 – Discuss how reporting requirement arises from special relationship with patient.	N/A
C 1.7.6.3 – Describe legal liability for failure to report.	N/A
1.7.7 – Health Care Regulation	
C 1.7.7.1 – Describe paramedic scope of practice.	
C 1.7.7.2 – Differentiate between licensure and certification.	1. Licensure a. Occupational regulation b. Practicing without a license 2. Certification (non-governmental)
C 1.7.7.3 – Describe credentialing of paramedics.	1. Jurisdiction-specific 2. Medical control
1.7.8 – Patient Rights/Advocacy	
C 1.7.8.1 – Identify patient rights inherent in providing EMS care.	1. Non-judgmental care a. Civil rights (discrimination) b. Human rights 2. Confidentiality a. Elements of confidential information i. Patient history ii. Assessment findings iii. Treatment rendered b. Release of information, requiring written permission i. Patient ii. Legal guardian iii. Legal substitution c. Limited release of information without permission i. Need to know (other healthcare providers) ii. Legal mandate (subpoena) iii. Third-party billing (HIPAA) d. Improper release of information i. Invasion of privacy (ridicule, notoriety, or embarrassment) ii. Defamation (libel or slander)
C 1.7.8.2 – Describe how the paramedic serves as a patient advocate.	1. EMTALA regulations 2. Shared decision-making
1.7.9 – End of Life Issues	
C 1.7.9.1 – Discuss the concept of limited resuscitation efforts.	1. Health care proxy 2. Medical Orders for Life Sustaining Treatments ("MOLST")
C 1.7.9.2 – Identify criteria for withholding resuscitation.	Obvious death criteria
C 1.7.9.3 – Explain when to terminate	N/A

resuscitation activities.	
C 1.7.9.4 – Discuss organ donation as an end of life patient decision/option.	N/A
1.7.10 – Ethical Principles/Moral Obligations	
C 1.7.10.1 – Define morals.	Concepts of right and wrong
C 1.7.10.2 – Define ethics.	1. Branch of philosophy 2. Study of morality
C 1.7.10.3 – Discuss the application of ethics and the use of ethical values.	N/A
C 1.7.10.4 – Examine ethical conflicts.	1. Futility of care (cardiac arrest in the wilderness) 2. Allocation of limited resources (medical rationing), such as use of triage 3. Professional misconduct, such as patient abuse 4. Economic triage, such as patient-dumping
A 1.7.10.5 – Practice ethical behavior.	
1.7.11 – Ethical Tests and Decision-Making	
C 1.7.11.1 – Define ethical tests used in decision-making.	1. Do no harm 2. In good faith 3. Patient's best interest
1.7.12 – Employment Law	
C 1.7.12.1 – Discuss the impact of various employment laws on EMS.	1. Americans with Disabilities Act ("ADA") 2. Title VII – Civil Rights Act 3. Amendments to Title VII 4. Family Medical Leave Act ("FMLA") 5. Occupational Safety and Health Act ("OSHA") 6. Ryan White Act

2. 0 – Anatomy and Physiology

Integrates a complex depth and comprehensive breadth of knowledge of the anatomy and physiology of all human systems.

2.1 – Anatomy and Physiology

Objective	Educational Standard
2.1.1 – Anatomical Terms	
C 2.1.1.1 – Define anatomy.	N/A
C 2.1.1.2 – Define physiology.	N/A
C 2.1.1.3 – Define pathophysiology.	N/A
C 2.1.1.4 – Define homeostasis.	N/A
C 2.1.1.5 – Identify specific body parts and areas.	1. Axillary 2. Brachial 3. Buccal 4. Cardiac 5. Cervical 6. Cranial 7. Cutaneous 8. Deltoid 9. Femoral 10. Gastric 11. Gluteal 12. Hepatic 13. Inguinal 14. Lumbar 15. Mammary 16. Nasal 17. Occipital 18. Orbital 19. Parietal 20. Patellar 21. Pectoral 22. Perineal 23. Plantar 24. Popliteal 25. Pulmonary 26. Renal 27. Sacral 28. Temporal 29. Umbilical 30. Volar
2.1.2 – Planes and Sections of the Body	
C 2.1.2.1 – Identify the planes and sections of the body.	1. Frontal (coronal) plane 2. Sagittal plane 3. Midsagittal plane 4. Transverse plane 5. Cross-section 6. Longitudinal section

2.1.3 – Anatomical Topography	
C 2.1.3.1 – Identify abdominal quadrants and regions.	1. Abdominal quadrants a. Right upper quadrant ("RUQ") b. Left upper quadrant ("LUQ") c. Right lower quadrant ("RLQ") d. Left lower quadrant ("LLQ") 2. Abdominal regions a. Right hypochondriac b. Epigastric c. Left hypochondriac d. Right lumbar e. Umbilical f. Left lumbar g. Right iliac h. Hypogastric i. Left iliac
2.1.4 – Organ Systems	
C 2.1.4.1 – Distinguish between body organ systems.	1. Skeletal 2. Muscular 3. Respiratory 4. Circulatory 5. Nervous 6. Integumentary 7. Digestive 8. Endocrine 9. Renal 10. Reproductive 11. Lymphatic and Immune System
2.1.5 – Anatomic Cavities	
C 2.1.5.1 – Identify anatomic cavities.	1. Dorsal a. Cranial cavity b. Spinal cavity 2. Ventral a. Thoracic cavity b. Abdominal cavity c. Pelvic cavity
2.1.6 – Organization	
C 2.1.6.1 – Discuss cellular composition at the atomic level.	1. Matter 2. Element 3. Atom 4. Proton 5. Neutron 6. Electron 7. Bonding a. Ionic b. Covalent c. Hydrogen bonds 8. Chemical reactions a. Synthesis b. Decomposition
C 2.1.6.2 – Discuss cellular composition at the chemical level.	1. Carbohydrates a. Monosaccharides b. Disccharides

	c. Oligosaccharides d. Polysaccharides e. Starches f. Glycogen g. Cellulose h. Fiber 2. Lipids a. True fats b. Triglycerides c. Phospholipids d. Steroids 3. Proteins a. Amino acids b. Peptide bonds c. Polypeptide 4. Enzymes (active site theory) 5. Nucleic acids a. DNS b. RNA c. ATP 6. Trace elements
2.1.7 – Cell Structure and Function	
C 2.1.7.1 – Discuss cell theory.	N/A
C 2.1.7.2 – Describe cellular anatomy and physiology.	1. Cell membrane 2. Cytoplasm 3. Nucleus and chromosomes 4. Organelles a. Mitochondria b. Lysosomes c. Golgi apparatus d. Ribosomes e. Endoplasmic reticulum
C 2.1.7.3 – Explain cellular respiration.	1. Aerobic 2. Anaerobic
C 2.1.7.4 – Describe the cellular environment.	1. Water compartments a. Intracellular ("ICF") b. Extracellular ("ECF") i. Plasma ii. Lymph iii. Interstitial fluid iv. Specialized fluids 1. Synovial 2. Cerebrospinal 3. Aqueous humor 2. Isotonic 3. Hypotonic 4. Hypertonic 5. Acid and base a. pH scale i. Base ii. Acid b. Normal pH ranges of body fluids

	c. Buffer system
C 2.1.7.5 – Describe cellular transport mechanisms.	1. Diffusion 2. Osmosis 3. Facilitated diffusion 4. Active transport 5. Filtration 6. Phagocytosis 7. Pinocytosis
C 2.1.7.6 – Discuss the process of cellular division.	1. Mitosis 2. Meiosis a. Genetic code b. Protein synthesis c. Differentiation d. DNA fingerprinting 3. Mutations
2.1.8 – Tissue Level of Organization and Membranes	
C 2.1.8.1 – List types of tissues and membranes.	1. Epithelial tissue a. Simple squamous b. Stratified squamous c. Transitional d. Simple cuboidal e. Simple columnar f. Ciliated 2. Connective tissue a. Blood b. Areolar c. Adipose d. Fibrous e. Elastic f. Bone g. Cartilage 3. Muscle tissue a. Smooth b. Skeletal c. Cardiac 4. Neural tissue 5. Membranes a. Pleura b. Pericardial c. Peritoneum-mesentery d. Specialized connective tissue i. Superficial fascia ii. Periosteum iii. Perichondrium iv. Synovial v. Deep fascia vi. Meninges vii. Fibrous pericardium
2.1.9 – Skeletal System	
C 2.1.9.1 – Describe the anatomy and physiology of the skeletal system.	1. Functions 2. Classification of bones a. Long bones

i. Diaphysis
ii. Epiphysis
iii. Marrow canal
iv. Yellow bone marrow
b. Short bones
c. Flat bones
d. Irregular bones
e. Joint surfaces
i. Articular cartilage
ii. Periosteum
3. Embryonic skeleton maturation
a. Bone matrix
b. Osteoblasts
c. Ossification (the production of bone matrix)
d. Fontanels
e. Epiphyseal discs
f. Osteoclasts
g. Marrow canal
4. Bone growth and maintenance
a. Heredity
b. Nutrition
c. Hormones
d. Exercise (stress)
5. Hormones involved in bone growth and maintenance
a. Growth hormone
b. Thyroxine
c. Insulin
d. Parathyroid hormone
e. Calcitonin
f. Estrogen
g. Testosterone
6. Major subdivision of the skeleton
a. Axial skeleton
b. Appendicular skeleton
7. Components
a. Skull
i. Cranial bones
1. Frontal
2. Temporal
3. Occipital
4. Sphenoid
5. Ethmoid
ii. Sutures
iii. Facial bones
1. Mandible
2. Condyloid joint
3. Maxillae
iv. Paranasal sinuses and ciliated epithelium
v. Mastoid sinuses
vi. Auditory bones
b. Vertebral column
i. Vertebrae
ii. Cervical vertebrae
1. Atlas
2. Pivot joint

3. Axis
iii. Thoracic vertebrae
iv. Lumbar vertebrae
v. Sacrum
vi. Sacroiliac joints
vii. Coccyx
c. Vertebral canal
i. Discs
ii. Symphysis joints
d. Rib cage
i. 12 pairs of ribs
ii. Sternum
iii. Manubrium
iv. Body
v. Xiphoid process
vi. True ribs
vii. False ribs
viii. Floating ribs
e. Shoulder and arm
i. Scapula
ii. Clavicle
iii. Humerus
iv. Radius
v. Ulna
vi. Carpals
vii. Metacarpals
viii. Phalanges
f. Hip and leg
i. Hip bones
ii. Illium
iii. Ischium
iv. Pubis
v. Pubic bones
vi. Pubic symphysis
vii. Acetabulum
viii. Femur
ix. Patella
x. Tibia
xi. Fibula
xii. Tarsala
xiii. Calcaneus
xiv. Talus
xv. Metatarsals
xvi. Phalanges
8. Classification of joints
a. Synathrosis (immovable)
b. Amphiarthrosis (slightly movable)
c. Diarthrosis (freely movable)
9. Types of joints
a. Gliding joints
b. Hinge joints
c. Pivot joints
d. Ball and socket joints
e. Saddle joints
f. Symphysis

	10. Synovial joints a. Anticular cartilage b. Joint capsule c. Synovial membrane d. Synovial fluid e. Bursae
2.1.10 – Muscular System	
C 2.1.10.1 – Describe the anatomy and physiology of the muscular system.	1. Gross anatomy a. Muscle fibers b. Tendons c. Fascia d. Periosteum e. Origin f. Insertion 2. Microscopic anatomy a. Myofibrils b. Myosin c. Actin d. Titin e. Troponin f. Tropomyosin g. Sarcoplasmic reticulum 3. Actions of muscles a. Flexion b. Extension c. Adduction d. Abduction e. Pronation f. Supination g. Dorsiflexion h. Plantar flexion i. Rotation 4. Contraction of a skeletal muscle fiber a. Nerve impulse i. Polarization ii. Depolarization iii. Repolarization iv. Action potential b. Neuromuscular junction and functions i. Axon terminal ii. Synapse c. Structure of the sarcomere d. Sliding filament theory of muscle contraction and function i. Acetylcholine ii. Calcium ions iii. Myosin and actin iv. Troponin and tropomyosin v. Cholinesterase e. Energy sources for muscle contraction i. ATP ii. Creatinine phosphate iii. Creatinine iv. Glycogen

	v. Glucose f. Hemoglobin, myoglobin, oxygen debt, lactic acid, and recovery oxygen uptake g. Aerobic and anaerobic endurance and the relationship to muscle movement 5. Major muscles of the body a. Antagonistic b. Synergistic
2.1.11 – Respiratory System	
C 2.1.11.1 – Describe the anatomy and physiology of the respiratory system.	1. General function of the respiratory system a. Upper respiratory tract b. Lower respiratory tract 2. Structure and functions of the nasal cavities and pharynx a. Nasal cavities i. Nose ii. Nasal cavities iii. Nasal septum iv. Nasal mucosa v. Olfactory receptors vi. Paranasal sinuses b. Pharynx i. Nasopharynx ii. Soft palate iii. Oropharynx iv. Laryngopharynx 3. Structure and function of the larynx and the speaking mechanism a. Voice box b. Thyroid cartilage c. Epiglottis d. Vocal cords e. Glottis 4. Structure and functions of the trachea and bronchial tree a. Trachea b. Primary bronchi c. Bronchial tree d. Right and left main-stem bronchi e. Bronchioles 5. Lungs a. Location and function b. Pleural membranes i. Parietal pleura ii. Visceral pleura iii. Serous fluid c. Hilus 6. Structure and function of the alveoli and pulmonary capillaries (and surfactant) 7. Mechanism of breathing – mechanical ventilation a. Mechanism of inhalation i. Inspiration ii. Phrenic nerve iii. Intercostal nerves iv. Respiration v. Ventilation/perfusion disturbance

	vi. Diaphragm vii. External intercostal muscles viii. Internal intercostal muscles ix. Pressures b. Changes in air pressure that occur within the thoracic cavity during respiration i. Atmospheric ii. Intrapleural iii. Intrapulmonic c. Role of the visceral and parietal pleura in respiration d. Mechanics of exhalation 8. Diffusion of gases in external and internal respiration 9. Pulmonary volumes a. Tidal volume b. Minute respiratory volume ("MRV") c. Inspiratory reserve volume d. Expiratory reserve volume e. Vital capacity f. Residual air volume 10. Physiological dead space and lung compliance 11. Oxygen and carbon dioxide transport in the blood 12. Nervous and chemical mechanisms that regulate respiration 13. Respiration affect on pH of certain body fluids 14. Respiration and acid-base balance a. Respiratory acidosis and alkalosis b. Metabolic acidosis and alkalosis
2.1.12 – Circulatory System	
C 2.1.12.1 – Describe the anatomy and physiology of the circulatory system.	1. Blood a. Composition and function of blood b. Composition and function of blood plasma i. Amount ii. Color iii. pH iv. Viscosity v. Plasma 1. Plama proteins 2. Prothrombin 3. Fibrinogen 4. Albumin 5. Globulins c. Primary hemopoietic tissue d. Function of red blood cells e. Nutrients necessary for red blood cell production f. Function of the following: i. Stem cells ii. Hemocytoblasts iii. Normoblasts iv. Reticulocyte g. Red blood cell production in hypoxic state h. Red blood cell and hemoglobin destruction i. ABO group and Rh factor blood types j. Types and function of white blood cells (Leukocytes) i. Neutrophils ii. Eosinophils

iii. Basophils
iv. Lymphocytes
v. Monocytes

k. Platelets role in hemostasis
i. Vascular spasm
ii. Platelet plugs
iii. Chemical clotting

l. Three stages of chemical blood clotting
m. Normal values in a complete blood count

2. The Heart
a. Location and features of the heart
i. Mediastinum
ii. Pericardial membranes
iii. Fibrous pericardium
iv. Parietal pericardium
v. Epicardium

b. Chambers of the heart
i. Myocardium
ii. Endocardium
iii. Right and left atria
iv. Right and left ventricles

c. Valves of the heart and their function
i. Tricuspid valve
ii. Bicuspid valve (mitral valve)
iii. Aortic valve
iv. Pulmonary semilunar valve

d. Cardiac cycle
e. Creation of heart sounds
i. Papillary muscles
ii. Chordae tendinae

f. Coronary arteries (coronary circulation)
g. Major blood vessels
h. Cardiac conduction pathway and its relationship to a normal electrocardiogram
i. Pacemaker cells
ii. Conduction cells

i. Stroke volume, cardiac output, and Starlings Law of the Heart
j. Nervous system regulation of the function of the heart

3. Blood vessels and circulation
a. Structure and function of the blood vessels, arteries, veins, and capillaries
b. Arterial and venous anastomosis
c. Structure of capillaries
d. Exchange of gases that occurs at the capillary level
e. Mechanism that regulates blood flow through arteries, capillaries, and veins
f. Pathway and purpose of the pulmonary circulation
g. Pathway of the systemic circulation
h. Pathway and purpose of the hepatic portal circulation
i. Fetal circulation
j. Branches of the aorta and their distributions
k. Major systemic arteries and the parts of the body they nourish
l. Major systemic veins and the parts of the body they

	drain of blood m. Hemodynamics i. Blood pressure 1. Venous return 2. Pulse pressure 3. Peripheral resistance ii. Factors that maintain systemic blood pressure 1. Heart rate and force of contraction 2. Vessel elasticity 3. Blood viscosity 4. Hormones 5. Peripheral resistance iii. Osmosis iv. Diffusion v. Facilitated diffusion vi. Active transport vii. Hydrostatic pressure viii. Oncotic pressure n. Regulation of blood pressure by the heart and kidneys o. Medulla and autonomic nervous system regulation of the diameter of the blood vessels p. Coordination of the cardiac, vasomotor, and respiratory centers to control blood flow through tissues
2.1.13 – Nervous System	
C 2.1.13.1 – Describe the anatomy and physiology of the nervous system.	1. Basic components a. Neuron i. Axon ii. Dendrites iii. Myelin sheath iv. Neurolemma v. Microglia vi. Astrocytes vii. Schwann cells viii. Neuroglia b. Type of neurons i. Sensory ii. Motor iii. Interneurons c. Nerves and tracts i. Sensory nerves ii. Motor nerves iii. Mixed nerve iv. Nerve tract (white matter) d. Nerve impulse i. Membrane potential and the conduction of an action potential 1. Polarization 2. Depolarization 3. Impulse transmission 4. Saluatory conduction ii. Impulse transmission at synapses 2. Central nervous system a. Function of the spinal cord b. Spinal nerves and function

c. Spinal cord reflexes
    i. Stretch reflexes
    ii. Reflex arc
    iii. Flexor reflexes
d. Parts of the brain
    i. Ventricles
    ii. Medulla
    iii. Pons midbrain
    iv. Cerebellum
    v. Hypothalamus
    vi. Thalamus
    vii. Cerebrum
    viii. Frontal lobes
    ix. Parietal lobes
    x. Temporal lobes
    xi. Occipital lobes
    xii. Basal ganglia
    xiii. Corpus callosum
e. Meninges location and function
f. Function of the blood-brain barrier
g. Location and functions of the cerebrospinal fluid

3. Peripheral nervous system
    a. Cranial nerves and function
        i. Olfactory nerves
        ii. Optic nerves
        iii. Oculomotor nerves
        iv. Trochlear nerves
        v. Trigeminal nerves
        vi. Abducens nerves
        vii. Facial nerves
        viii. Vestibulocholear nerves
        ix. Glossopharyngeal nerves
        x. Vagus nerves
        xi. Accessory nerves
        xii. Hypoglossal nerves
    b. Distribution pattern of spinal nerves
    c. Sensory and motor pathways
        i. Sensory pathways
            1. Posterior column pathway
            2. Spinothalamic pathway
            3. Spinocerebellar pathway
        ii. Motor pathways
            1. Pyramidal system
            2. Extrapyramidal system
    d. Sympathetic division of the autonomic nervous system
    e. Parasympathetic division of the autonomic nervous system
    f. Effects of the sympathetic and parasympathetic divisions of the autonomic nervous system on various organs of the body
        i. Eyes
        ii. Skin
        iii. Cardiovascular system
        iv. Adrenal glands
        v. Respiratory system

vi. Digestive system
vii. Skeletal muscles
viii. Urinary system
ix. Reproductive system

4. Sensory function
   a. General purposes of sensations
   b. General sense and the special senses
      i. General senses
         1. Pain
         2. Temperature
         3. Touch, pressure, position
         4. Chemical detection
      ii. Special senses
         1. Smell
         2. Taste
         3. Vision
         4. Hearing
         5. Balance
   c. Parts of the sensory pathway and the general functions of each
      i. Receptors
      ii. Sensory neurons
      iii. Sensory tracts
      iv. Sensory areas
   d. Characteristics of sensations
      i. Projection (phantom pain)
      ii. Intensity
      iii. Contrast
      iv. Adaptation
      v. After-image
   e. Characteristics of cutaneous senses
      i. Free nerve endings
      ii. Encapsulated nerve endings
      iii. Neuropathy
   f. Referred pain
   g. Importance of proprioception or muscle sense
   h. Pathways for the sense of taste
      i. Taste buds
      ii. Chemoreceptors
      iii. Transmission via the facial and glossopharyngeal nerves
   i. Pathways for the sense of smell
      i. Olfaction chemoreceptors
      ii. Olfectory cranial nerves
   j. Sensation of hunger and thirst
      i. Visceral sensations
      ii. Hypothalamus receptors
      iii. Water to salt proportion
   k. Components of the eye and function
      i. Vision receptors
      ii. Refracting system
      iii. Eyelids
      iv. Lacrimal apparatus
      v. Conjuctiva (conjunctivitis)
      vi. Lacrimal glands

1. Tears
2. Lysozome enzyme

vii. Lacrimal sac
viii. Nasolacrimal duct
ix. Eyeball
1. Orbit
2. Extrinsic muscles
3. Layers of the eyeball
a. Sclera
b. Cornea
c. Choroid layer
d. Ciliary body
e. Suspensory ligaments
f. Iris
g. Pupil
h. Lens (cataracts)
i. Retina
j. Rods
k. Macula area
l. Macula lutea
m. Fovea
n. Ganglion neurons
o. Optic disc
4. Cavities
a. Posterior cavity (vitreous humor)
b. Anterior cavity
i. Aqueous humor (glaucoma)
ii. Canal of Schlemm
5. Physiology of vision
a. Refraction
i. Nearsightedness (myopia)
ii. Farsightedness (hyperopia and presbyopia)
iii. Astigmatism
iv. Strabismus
v. Amblyopia
b. Rods and rhodopsin
c. Cones and color blindness
d. Optic nerve
e. Optic hiasma
f. Occipital lobes of cerebral cortex (binocular vision)

l. Components and function of the ear
i. Outer ear
1. Auricle (pinna)
2. Ear canal
ii. Middle ear
1. Eardrum (tympanic membrane)
2. Malleus
3. Incus
4. Stapes
5. Oval window
6. Eustachian tube
iii. Inner ear
1. Bony labyrinth

	2. Membraneous labyrinth 3. Perilymph 4. Endolymph 5. Cochlea a. Medial canal b. Organ of Corti c. Round window d. Utricle and saccule (otoliths) e. Semicircular canals 6. Process of hearing, vibration transmission, and nerve impulse generation (deafness) a. Conduction deafness b. Nerve deafness c. Central deafness 7. Physiology of equilibrium iv. Proprioception v. Arterial pressoreceptors and chemoreceptors
2.1.14 – Integumentary System	
C 2.1.14.1 – Describe the anatomy and physiology of the integumentary system.	1. General functions of the integumentary system 2. Layers and functions of the skin a. Epidermis b. Dermis c. Subcutaneous tissue 3. Additional skin structures a. Stratum corneum b. Stratum germinativum c. Melanocytes d. Melanin 4. Cutaneous senses 5. Other structures and function a. Hair b. Nails c. Sebaceous glands d. Ceruminous glands e. Eccrine sweat glands 6. Dermal arterioles response to heat, cold, and stress 7. Structure and function of subcutaneous tissue 8. Skin response to injury and repair process 9. Effects of the aging process on the skin
2.1.15 – Digestive System	
C 2.1.15.1 – Describe the anatomy and physiology of the digestive system.	1. General functions of the digestive system and the major divisions a. Alimentary tube b. Accessory organs 2. Accessory organs of digestion 3. Mechanical and chemical digestion 4. Structure and function of the teeth and tongue 5. Function of saliva 6. Location and function of the pharynx and esophagus 7. Mechanical and chemical breakdown of food in the mouth 8. Mechanics of swallowing 9. Location, structure, and function of the stomach, small intestine, liver, gallbladder, and pancreas 10. Four layers of the alimentary canal

	a. Mucosa b. Submucosa c. External muscle layer d. Serosa 11. Absorption in the large and small intestine 12. Function of the normal flora in the colon 13. Peristalsis and chime
2.1.16 – Endocrine System	
C 2.1.16.1 – Describe the anatomy and physiology of the endocrine system.	1. Function of the endocrine system 2. Endocrine and exocrine glands 3. Endocrine glands and the hormones secreted a. Prostaglandin b. Target organs c. Target tissue 4. Chemistry of hormones a. Amines b. Proteins c. Steroids 5. Regulation of hormone secretion (positive and negative feedback mechanisms) 6. Pituitary gland (posterior pituitary gland) a. Antidiuretic hormone (“ADH”) b. Osmoreceptors c. Oxytocin 7. Anterior pituitary gland a. Growth hormone (“GH”) b. Thyroid-stimulating hormone (“TSH”) c. Adrenocorticotropic hormone (“ACTH”) d. Prolactin e. Follicle-stimulating hormone (“FSH”) f. Luteinizing hormone (“LH”) 8. Thyroid gland a. Thyroxine (“T4”) i. Goiter ii. Cretinism iii. Myxedema iv. Graves’ disease b. Triiodothyronine (“T3”) c. Clacitonin 9. Parathyroid hormone (“PTH”) and calcitonin 10. Pancreas a. Islits of Langerhans i. Alpha cells ii. Beta cells iii. Delta cells b. Insulin i. Diabetes mellitus ii. Hyperglycemia iii. Hypoglycemia c. Glucagon d. Somatastatin 11. Relationship between insulin and glucagon 12. Prostaglandins 13. Adrenal glands

	a. Adrenal medulla i. Epinephrine ii. Norepinephrine b. Adrenal cortex i. Mineralocorticoids 1. Aldosterone 2. Rennin-angiotensin mechanism ii. Gluccocorticoids (cortisol) 1. Gluconeogenesis 2. Anti-inflammatory effects (histamine) c. Sex hormones i. Estrogen ii. Progesterone iii. Inhibin iv. Testosterone d. Diseases of the adrenal cortex i. Addison's disease ii. Cushing's syndrome 14. How protein hormones and steroid hormones exert their effects 15. Coordinated physiological responses controlled by hormones 16. Hormones that are especially important to normal growth and development
2.1.17 – Renal System	
C 2.1.17.1 – Describe the anatomy and physiology of the renal system.	1. Location and general function of each organ in the urinary system 2. Components of a nephron and the associated blood vessels 3. Process of urine formation a. Glomerular filtration b. Tubular reabsorption c. Tubular secretion d. Kidney blood flow 4. Kidneys function in maintaining normal blood volume and pressure 5. Kidneys maintenance of normal blood pH and electrolyte balance 6. Hormones that affect kidney function a. Aldosterone b. Atrial natriuretic peptide ("ANP") c. Antidiuretic hormone ("ADH") d. Parathyroid hormone ("PTH") 7. Urination reflex and voluntary control 8. Characteristics of normal urine a. Amount b. Color c. Specific gravity d. pH e. Constituents f. Nitrogenous wastes 9. Water compartments 10. Water movement between the compartments 11. Water entry and exit in the body 12. Water and electrolyte distribution in the body

	13. Basic concepts involved in the control of fluid and electrolyte regulation 14. Buffering systems that balance pH of the intracellular and extracellular fluids
2.1.18 – Reproductive System	
C 2.1.18.1 – Describe the anatomy and physiology of the reproductive system for each gender.	1. Define the following: a. Diploid b. Haploid c. Gamates d. Endometrium e. Genetic disease f. Homologous chromosomes g. Autosomes h. Sex chromosomes i. Genes j. Alleles k. GenotypePhenotype l. Homomzygous m. Heterozygous 2. Spermatogenesis and oogenesis 3. Hormones necessary for the formation of gamates 4. Essential and accessory reproductive organs of the male and female 5. Structures that constitute external genitals in both genders 6. Parts of the sperm cell 7. Life cycle of an oocyte 8. Menstrual cycle in terms of changes in hormone levels and the condition of the endometrium 9. Major developmental changes during gestation 10. Function and structure of the placenta and umbilical cord 11. Fetal circulation/respiration 12. Average gestation period 13. Stages of labor 14. Physiologic changes in infant after birth
2.1.19 – Lymphatic and Immune System	
C 2.1.19.1 – Describe the anatomy and physiology of the lymphatic and immune system.	1. Major components and functions of the lymphatic system 2. Formation of lymph fluid 3. Lymph vessels and return to the blood 4. Location and function of lymph nodes and the spleen 5. Lymphocytes 6. Immunity a. Antigens b. Antibodies 7. Innate immunity a. Defensive cells i. Natural killer cells (“NK cells”) ii. Basophils iii. Mast cells iv. Phagocytes v. Langerhans cells b. Chemical defenses i. Interferons ii. Complement

	iii. Inflammation iv. Fever 8. Adaptive immunity a. Cell-mediated b. Antibody mediated 9. Thymus a. Stem cells b. T lymphocytes (T cells) 10. Humoral immunity and cell mediated immunity 11. Development and function of B cells and T cells 12. Acquired immunity and genetic immunity 13. Vaccinations 14. Classification of microorganisms 15. Distribution of and benefits of normal flora 16. Infectious disease (methods by which infectious diseases are spread)
2.1.20 – Nutrition, Metabolism, and Body Temperature	
C 2.1.20.1 – Describe the process by which the body regulates its internal temperature.	1. Normal range of body temperature 2. Homeostatic mechanisms that maintain a constant body temperature 3. Metabolism, catabolism, anabolism, basal metabolic rate, and kilocalories 4. Methods by which heat is generated and lost in the body a. Thyroxine b. Sympathetic stimulation c. Respiration d. Skeletal muscles e. Liver Food 5. Fever a. Cause b. Advantages c. Disadvantages 6. Hypothalamus function as the thermostat in the body
C 2.1.20.2 – Explain cellular respiration and metabolism.	1. Cell respiration a. Byproducts b. Disposal of byproducts 2. Cellular metabolism a. Metabolic roles of fats, glucose, and proteins b. Synthesis uses for glucose, amino acids, and fats c. Metabolic rate and kilocalories d. Factors that affect metabolic rate
C 2.1.20.3 – Discuss the functions of vitamins, minerals, and other important nutrients.	1. Basic food groups 2. Minerals, vitamins, and water 3. Significance of caloric value of foods

3.0 – Medical Terminology

Integrates comprehensive anatomical and medical terminology and abbreviations into the written and oral communication with colleagues and other health care professionals.

3.1 – Medical Terminology

Objective	Educational Standard
3.1.1 – Medical Terminology	
C 3.1.1.1 – Explain the impact of utilizing proper medical terminology in both written and oral communications with colleagues and other health care professionals to ensure quality patient care.	1. Importance 2. Basic rules and elements 3. Wood roots, prefixes, and suffixes 4. Literal meanings from medical terms based on word construction 5. Define common abbreviations and interpret common symbols 6. Body structure 7. Body systems

4.0 – Pathophysiology

Integrates comprehensive knowledge of pathophysiology of major human systems.

4.1 – Pathophysiology

Objective	Educational Standard
4.1.1 – Introduction – Correlation of Pathophysiology with Disease Process	
C 4.1.1.1 – Discuss the correlation of pathophysiology with disease processes.	1. Cells appear similar to multicellular "social" organism 2. Cells communicate electrochemically 3. Coordination of specific bodily functions a. Endocrine b. Exocrine c. Other coordinating receptors i. Chemoreceptors ii. Baroreceptors iii. Adrenergic iv. Others
4.1.2 – Basic Cellular Review	
C 4.1.2.1 – Discuss the major classes of cells.	N/A
C 4.1.2.2 – Describe chief cellular functions.	1. Differentiation or maturation 2. Perform one function or act in concert with other cells to perform a more complex task
C 4.1.2.3 – Describe cellular components, their structures, and functions.	1. Structure and function 2. Three main components
C 4.1.2.4 – Identify different tissue types.	1. Epithelial tissue 2. Connective tissue 3. Muscle tissue 4. Nervous tissue
4.1.3 – Alterations in Cells and Tissues	
C 4.1.3.1 – Discuss types of cellular adaptation.	1. Atrophy 2. Hypertrophy 3. Hyperplasia 4. Dysplasia 5. Metaplasia
C 4.1.3.2 – Describe the ways in which cellular injury occurs.	1. Hypoxic injury a. Most common b. May result from i. Decreased amounts of oxygen ii. Loss of hemoglobin or hemoglobin function iii. Decreased number of red blood cells iv. Respiratory or cardiovascular system disease v. Loss of cytochromes 2. Chemical injury from agents such as: a. Poisons

	b. Lead c. Carbon monoxide d. Ethanol e. Pharmacological 3. Infectious injury a. Virulence or pathogenicity of microorganisms via: i. Invading and destroying cells ii. Producing toxins iii. Producing hypersensitivity reactions b. Bacteria i. Survival and growth ii. Bacteria produce enzymes or toxins 1. Toxins a. Exotoxins b. Endotoxins 2. Fever is caused by pyrogens 3. Inflammation 4. Hypersensitivity 5. Bacteremia or septicemia c. Viruses i. Among the most common afflictions ii. Intracellular parasites iii. Protein coat (capsid) iv. Viruses do not produce exotoxins or endotoxins 4. Immunologic and inflammatory injury a. Cellular membranes b. Rapid leakage of potassium out of the cell and an influx of water 5. Injurious genetic factors 6. Injurious nutritional imbalances 7. Injurious physical agents
C 4.1.3.3 – Discuss the manifestation of cellular injury.	1. Cellular manifestations 2. Systemic manifestations
C 4.1.3.4 – Describe cellular death / necrosis.	N/A
4.1.4 – The Cellular Environment	
C 4.1.4.1 – Describe the distribution of body fluids.	1. Intracellular fluid ("ICF") 2. Extracellular fluid ("ECF") a. Interstitial fluid b. Intravascular fluid c. Other 3. Total body water ("TBW")
C 4.1.4.2 – Discuss the impact aging has on the distribution of body fluids.	1. Birth 2. Infancy 3. Childhood 4. Adulthood 5. Elderly
C 4.1.4.3 – Describe the way in which water moves between intracellular fluid and extracellular fluid.	1. Osmotic forces 2. Role of sodium and potassium
C 4.1.4.4 – Describe the way in which water moves between plasma and interstitial fluid.	1. Osmotic forces within capillary bed 2. Starling's hypothesis 3. Role of capillary and membrane permeability

C 4.1.4.5 – Explain alterations in water movement within the body (edema).	1. Pathophysiology a. Increased capillary permeability b. Decreased oncotic pressure c. Increased capillary hydrostatic pressure d. Hydrostatic pressure e. Lymphatic vessel obstruction 2. Clinical manifestations a. Local b. Generalized 3. Evolution and treatment
C 4.1.4.6 – Describe water balance and the role of electrolytes.	1. Water balance a. Role of antidiuretic hormone ("ADH") b. Receptors i. Osmoreceptors ii. Volume sensitive receptors iii. Baroreceptors 2. Sodium and chloride balance a. Role and function of sodium as a cation b. Role and function of chloride as an anion c. Hormone regulation by aldosterone and natriuretic hormone d. Role of renin-angiotensin system 3. Alterations in sodium, chloride, and water balance a. Isotonic alterations i. Isotonic volume depletions ii. Isotonic volume excesses b. Hypertonic alterations i. Hypernatremia ii. Water deficit iii. Hyperchloremia c. Hypotonic alterations i. Hyponatremia ii. Water excess iii. Hypochloremia 4. Alterations in potassium, calcium, phosphate, and magnesium balance a. Potassium i. Hypokalemia ii. Hyperkalemia b. Calcium and phosphate i. Hypocalcemia ii. Hypercalcemia iii. Hypophosphatemia iv. Hyperphosphatemia c. Magnesium i. Hypomagnesemia ii. Hypermagnesemia
C 4.1.4.7 – Describe the acid-base balance within the body.	1. Hydrogen ion and pH 2. Buffer systems a. Carbonic acid-bicarbonate buffering b. Protein buffering c. Renal buffering d. Other buffers 3. Acid-based imbalances

	a. Metabolic acidosis i. Pathophysiology ii. Clinical presentation iii. Evaluation and treatment b. Metabolic alkalosis (rare) i. Pathophysiology ii. Clinical presentation iii. Evaluation and treatment c. Respiratory acidosis i. Pathophysiology ii. Clinical presentation iii. Evaluation and treatment d. Respiratory alkalosis i. Pathophysiology ii. Clinical presentation iii. Evaluation and treatment
4.1.5 – Genetics and Familial Diseases	
C 4.1.5.1 – Identify factors that cause disease.	1. Genetic 2. Environmental a. Microorganisms and immunologic exposures b. Personal habits and lifestyle c. Chemical substances d. Physical environment e. Psychosocial environment 3. Age and gender a. Accumulative affects of both genetic and environmental factors b. Lifestyle, anatomic, or hormonal differences
C 4.1.5.2 – Analyze disease risk.	1. Disease rates a. Incidence rate b. Prevalence rate c. Mortality rate 2. Risk factor analysis a. Causal risk factors b. Noncausal risk factors
C 4.1.5.3 – Describe the combined effects and interaction among risk factors.	1. Familial disease tendency 2. Aging and age-related disorders
C 4.1.5.4 – Describe familial disease and associated risk factors.	1. Immunologic disorders a. Allergies b. Asthma c. Rheumatic fever 2. Cancer a. Breast cancer b. Colorectal cancer c. Lung cancer 3. Endocrine disorders – Diabetes mellitus a. Insulin-dependent diabetes mellitus b. Non-insulin dependent diabetes mellitus 4. Hematologic disorders a. Drug-induces hemolytic anemia b. Hemophilia

	c. Hematochromatosis 5. Cardiovascular disorders a. Long QT syndrome (autosomal dominant disorder) b. Cardiac myopathies c. Mitral valve prolapse d. Coronary heart disease i. Family history and coronary heart disease risk ii. Genetic factors and predisposition e. Hypertension and stroke 6. Renal disorders a. Gout (uric acid accumulation) b. Kidney stones 7. Gastrointestinal disorders a. Malabsorption disorders i. Lactose intolerance ii. Ulcerative colitis iii. Crohn's disease b. Peptic ulcers c. Gallstones d. Obesity i. Associated disease processes ii. Causal risk factors 8. Neuromuscular disorders a. Huntington disease b. Muscular dystrophy c. Multiple sclerosis d. Alzheimer disease 9. Psychiatric disorders a. Schizophrenia b. Manic-depressive
4.1.6 – Hypoperfusion	
C 4.1.6.1 – Describe the pathogenesis of hypoperfusion.	1. Decreased cardiac output 2. Compensatory mechanisms a. Catecholamine release i. Epinephrine and norepinephrine ii. Increase in systemic vascular resistance b. Role of aldosterone, renin-angiotensin, and ADH i. Adequate or increased blood volume ii. Vasoconstriction increases systemic blood pressure c. Shift of interstitial fluid d. Splenic discharge 3. Increased preload stroke volume, and heart rate a. Increased myocardial oxygen demand b. Systemic and pulmonary edema i. Dyspnea ii. Dusky skin color iii. Low blood pressure iv. Oliguria v. Impaired mentation c. Decreased cardiac output and ejection fraction i. Decreased blood pressure ii. Decreased tissue perfusion iii. Impaired cellular metabolism

C 4.1.6.2 – Differentiate between the different types of shock, their pathophysiology, evaluation, and treatment.	1. Cardiogenic shock a. Defined b. Pathophysiology c. Evaluation and treatment 2. Hypovolemic shock a. Defined b. Pathophysiology c. Evaluation and treatment 3. Neurogenic shock a. Defined b. Pathophysiology c. Evaluation and treatment 4. Anaphylactic shock a. Defined b. Pathophysiology c. Evaluation and treatment 5. Septic shock a. Defined b. Pathophysiology c. Evaluation and treatment
C 4.1.6.3 – Explain multiple organ dysfunction syndrome ("MODS").	1. Defined a. Progressive failure of two or more organ systems b. Occurs after severe illness or injury c. New diagnosis first described in 1975 d. Mortality rate of 60% to 90% e. Major cause of death following septic, traumatic, and brain injuries 2. Pathophysiology a. Injury or endotoxin release b. Vascular endothelial damage, neuroendocrine response, and release of inflammatory mediators c. Activation of complement, coagulation, and kallikrein/kinnin systems d. Massive systemic immune/inflammatory and coagulation responses e. Vascular changes i. Vasodilation ii. Increase in capillary permeability iii. Selective vasoconstriction iv. Microvascular thrombi f. Maldistribution of systemic and organ blood flow g. Hypermetabolism h. Oxygen supply/demand imbalance i. Tissue hypoxia i. Tissue hypoperfusion ii. Exhaustion of fuel supply (i.e., ATP, glucose, etc.) iii. Metabolic failure iv. Lysosome breakdown v. Anaerobic metabolism vi. Acidosis and impaired cellular function j. Organ dysfunction i. Decreased cardiac function and myocardial depression ii. Renal failure iii. Failure of smooth muscle of vascular system

	1. Release of capillary sphincters 2. Vasodilation 3. Clinical presentation (24 hours after initial resuscitation) a. Low-grade fever b. Tachycardia c. Dyspnea and adult respiratory distress syndrome ("ARDS") d. Altered mental status e. Hyperdynamic state f. Hypermetabolic states g. Renal and liver failure (14 to 21 days) h. Gastrointestinal and immune collapse (14 to 21 days) i. Cardiovascular collapse and death (21 to 28 days)
C 4.1.6.4 – Describe the cellular metabolism impairment that occurs as a result of hypoperfusion.	1. Oxygen impairment a. Anaerobic metabolism b. Increased lactate c. Metabolic acidosis d. Decreased oxygen affinity for hemoglobin e. Decreased ATP f. Changes in cellular electrolytes g. Cellular edema h. Release of lysosomal enzymes 2. Impaired glucose use a. Increase serum glucose b. Catecholamines, cortisol, growth hormone release c. Increased gluconeogenesis, gluconeolysis, and lipolysis
4.1.7 – Self-Defense Mechanisms	
C 4.1.7.1 – Identify the lines of defense in protecting the body from disease and injury.	1. Anatomic barriers 2. Inflammatory response 3. Immune response
C 4.1.7.2 – Describe the characteristics of the immune response.	1. Natural versus acquired response a. Natural or native immunity b. Acquired immunity i. Active acquired immunity ii. Passive acquired immunity 2. Primary versus secondary immunity a. Primary or initial immune response b. Secondary or anamnestic immune response 3. Humoral versus cell-mediated immunity a. B-cell lymphocyte b. T-cell lymphocyte
C 4.1.7.3 – Discuss, in general / introductory terms, the immune response.	1. Antigens and immunogens a. Antigens b. Immunogen c. Tolerance d. Molecular size i. Larger – Proteins, polysaccharides, and nucleic acids ii. Smaller – Amino acids, monosaccharides, and fatty acids iii. Haptens – Smaller molecules which become immunogenic 2. Histocompatibility antigens ("HLA antigens")

	a. HLA complexes or major histocompatibility complexes ("MHC") b. Role of HLA antigens 3. Blood group antigens a. Rh system b. ABO system
C 4.1.7.4 – Describe humoral immune response.	1. B-cell lymphocytes – Formation a. Lymphoid stem cell b. Generation of clonal diversity c. Clonal selection d. Activated B-cell i. Immunoglobulin-secreting plasma cells ii. Memory cells 2. Immunoglobulins a. Differences between immunoglobulins and antibodies b. Structure of immunoglobulin molecules c. Function of antibodies i. Agglutination ii. Precipitation iii. Neutralization 1. Baterial toxins 2. Viruses 3. Opsonization of bacteria 4. Activation of inflammatory processes 5. Classes of immunoglobulins 6. Antibodies as antigens iv. Isotypic antigens v. Allotypic antigens vi. Idiotypic antigenic determinants d. Monoclonal antibodies 3. Secretory immune system a. Mucosal-associated lymphoid tissue i. Lacrimal glands ii. Salivary glands iii. Bronchial-associated lymphoid tissue iv. Mammary-associated lymphoid tissue v. Gut-associated lymphoid tissue vi. Genital-associated lymphoid tissue b. Circulates independently of other lymphocytes i. Mucosal-association lymphoid tissue ii. Regional lymph nodes iii. Thoracic duct iv. Blood c. First line of defense d. Local rather than systemically
C 4.1.7.5 – Describe cell-mediated immune response.	1. T-cells a. Five types of mature T-cells i. Memory cells ii. Td cells or lymphokine-producing cells iii. Tc cells or cytotoxic cells iv. Th cells or helper T-cells v. Ts cells or suppressor T-cells b. Proliferation and differentiation

	2. Major effects of cell-mediated immune response a. Cytotoxicity b. Delayed hypersensitivity c. Memory d. Control
C 4.1.7.6 – Explain cellular interactions in the immune response.	1. Cytokines a. Lymphokines b. Monokines 2. Antigen processing, presentation, and recognition a. Antigen degradation b. Classes of histocompatible antigens ("HLA") c. T-cell receptors d. Interleukin-1 ("IL-1") 3. T-cell and B-cell differentiation a. T-cell differentiation b. B-cell differentiation c. Control of B- and T-cell development
C 4.1.7.7 – Discuss fetal and neonatal immune function.	1. Fetal immunological capabilities a. Immunologic responses b. Antibody capabilities 2. Antibody levels a. Umbilical cord blood b. Neonatal circulation 3. Trophoblasts
C 4.1.7.8 – Discuss aging and its affects on the immune response in the elderly.	1. T-cell function 2. Antibody production
4.1.8 – Inflammation	
C 4.1.8.1 – Describe the acute inflammatory response.	1. Triggers a. Lethal cellular injury b. Non-lethal cellular injury c. Other microorganisms 2. Response a. Vascular responses to inflammation b. Cellular responses to inflammation
C 4.1.8.2 – Discuss mast cells and their role in the inflammatory response.	1. Degranulation of vasoactive amines and chemotactic factors a. Stimulation of degranulation i. Physical injury ii. Chemical agents iii. Immunological (IgE-mediated hypersensitivity) b. Vasoactive amines i. Histamine ii. Serotonin c. Chemotactic factors i. Neutrophil ii. Eosinophil 2. Synthesis of leukotrienes and prostaglandins a. Leukotrienes or slow-reacting substances of anaphylaxis ("SRS-A") i. Composition ii. Function b. Prostaglandins i. Composition ii. Function

C 4.1.8.3 – Discuss plasma protein systems.	1. Complement system a. Structure and function b. Activation i. Classic pathway ii. Alternative pathway 2. Clotting system a. Structure and function b. Activation i. Extrinsic pathway ii. Intrinsic pathway 3. Kinin system a. Structure and function b. Activation (plasma kinin cascade) 4. Control and interaction of the plasma protein system a. Reason for control b. Types of control i. Antagonists ii. Histamine control iii. Interaction of control processes
C 4.1.8.4 – Discuss the role of cellular components as part of the inflammation response.	1. Functions of phagocytes a. Margination b. Diapedesis c. Exudation into inflamed tissue d. Process of phagocytosis 2. Polymorphonuclear neutrophils a. Predominance in early inflammatory response b. Role 3. Monocytes and macrophages a. Monocyte (young macrophage) i. Structure ii. Role b. Macrophages i. Structure ii. Role 4. Eosinophils a. Structure b. Role
C 4.1.8.5 – Discuss the role of cellular products as part of the inflammation response.	1. Interleukins (“ILs”) a. Interleukin-1 b. Interleukin-2 2. Lymphokines a. Production b. Types and effects i. Migration-inhibitory factor ii. Macrophage-activation factor 3. Interferon a. Structure b. Actions and effects
C 4.1.8.6 – Describe systemic responses to acute inflammation.	1. Fever a. Activation b. Effects 2. Leukocytosis a. Activation b. Effects

	3. Increase in circulating plasma proteins or acute-phase reactants a. Activation b. Effects
C 4.1.8.7 – Discuss chronic inflammation responses.	1. Causes a. Unsuccessful acute inflammatory response b. Persistence of infection or antigen 2. Characteristics a. Persistence of acute inflammation response b. Neutrophil degranulation and death c. Lymphocyte activation d. Fibroblast activation e. Infiltration (pus) f. Tissue repair (scar)
C 4.1.8.8 – Describe local inflammation responses.	1. Vascular changes a. Vasodilation b. Increased capillary permeability 2. Exudation a. Functions b. Compositions
C 4.1.8.9 – Discuss phases of resolution and repair.	1. Definitions a. Regeneration b. Repair c. Debridement d. Primary intention e. Secondary intention 2. Reconstruction phase a. Initial wound response b. Granulation c. Epithelialization
C 4.1.8.10 – Discuss the effect of age-related self-defense mechanisms on the inflammatory process.	1. Newborn 2. Elderly
4.1.9 – Variances In Immunity and Inflammation	
C 4.1.9.1 – Discuss hypersensitivity (allergy, autoimmunity, and isoimmunity).	1. Definitions a. Hypersensitivity b. Allergy c. Autoimmunity d. Isoimmunity 2. Mechanisms of hypersensitivity a. Immediate versus delayed reactions b. IgE reactions i. Role of IgE ii. Mechanism of IgE iii. Clinical indications iv. Genetic predisposition v. IgE-mediated hypersensitivity tests vi. Desensitization c. Tissue-specific reactions i. Tissue-specific antigens ii. Mechanisms d. Immune-complex mediated injury

	i. Mechanisms ii. Immune-complex disease e. Cell-mediated tissue destruction i. Mechanisms ii. Clinical instances 3. Targets of hypersensitivity a. Allergy i. Allergens ii. Neoantigen b. Autoimmunity i. Breakdown of tolerance ii. Original insult iii. Genetic factors c. Isoimmunity i. Transient neonatal diseases ii. Transplant rejections and transfusion reactions 4. Autoimmune and isoimmune diseases a. Grave's disease b. Rheumatoid arthritis c. Myasthenia gravis d. Immune thrombocytopenic purpura e. Isoimmune neutropenia f. Systemic lupus erythematosus ("SLE") g. Rh and ABO isoimmunization
C 4.1.9.2 – Discuss immunity and inflammation deficiencies.	1. Congenital immune deficiencies 2. Acquired deficiencies a. Nutritional deficiencies b. Iatrogenic deficiencies c. Deficiencies caused by trauma d. Deficiencies caused by stress e. AIDS 3. Replacement therapies for immune deficiencies a. Gamma globulin therapy b. Transplantation and transfusion c. Gene therapy
4.1.10 – Stress and Disease	
C 4.1.10.1 – Discuss concepts related to stress.	1. Triad of manifestation 2. General adaptation syndrome (Selye) a. Alarm stage b. Resistance or adaptation stage c. Exhaustion stage d. Definition of physiological stress 3. Psychologic mediators and specificity a. Psychologic factors' effect on physiological responses to stress b. Pituitary gland and adrenal cortex sensitivity to emotional, psychologic, and social influences 4. Homeostasis as a dynamic steady state a. Definitions i. Dynamic steady state ii. Turnover b. Reaction of body to stressors
C 4.1.10.2 – Discuss stress responses.	1. Psychoneuroimmunologic response a. Interaction of consciousness, brain and central

nervous system, and the body's defense mechanisms
b. Stress response
2. Neuroendocrine regulation
a. Catecholamines
i. Components
1. Epinephrine
2. Norepinephrine
ii. Physiologic actions of alpha and beta receptors
1. $Alpha_1$
2. $Alpha_2$
3. $Beta_1$
4. $Beta_2$
iii. Physiologic effects of catecholamines
1. Brain
2. Cardiovascular
3. Pulmonary Muscle
4. Liver
5. Adipose tissue
6. Skin
7. Skeleton
8. GI and GU systems
9. Lymphoid tissue
b. Cortisol
i. Source
ii. Primary effects of cortisol
1. Stimulation of glucogenesis
2. Formation of glycogen
3. Cortisol effects of cell-mediated immunity
iii. Other physiologic effects of cortisol
1. Protein metabolism
2. Digestive function
3. Urinary function
4. Connective tissue function
5. Muscle function
6. Bone function
7. Vascular system and myocardial function
8. Central nervous system function
c. Other hormones
i. Endorphins
ii. Growth hormone
iii. Prolactin
iv. Testosterone
d. Role of the immune system
i. Interaction of immune, nervous, and endocrine systems during a stress response
ii. Influence of stress response on immune system
iii. Relationship between stress and immune-related conditions and diseases
1. Cardiovascular
2. Muscles
3. Connective tissue
4. Pulmonary system
5. Immune System
6. GI system
7. GU system

	8. Skin 9. Endocrine 10. Central nervous system
C 4.1.10.3 – Discuss the interrelationships between stress, coping, and illness.	1. Stress as interdependent processes a. Definition of physiologic stress and psychologic distress b. Effects of psychologic distress c. Relationship between distress and immune dysfunction 2. Potential stress effects on: a. Health individuals i. Ineffective coping ii. Effective coping b. Symptomatic individuals i. Ineffective coping ii. Effective coping c. Medical interventions i. Ineffective coping ii. Effective coping

5.0 – Life Span Development

Integrates comprehensive knowledge of life span development.

5.1 – Life Span Development

Objective	Educational Standard
5.1.1 – Infancy (Birth to One Year)	
C 5.1.1.1 – Discuss the physiological and psychosocial characteristics of infants.	1. Physiological a. Vital signs i. Heart rate ii. Respiratory iii. Blood pressure iv. Temperature ranges b. Weight c. Cardiovascular system d. Pulmonary system e. Renal system f. Immune system g. Nervous system i. Movements ii. Reflexes iii. Fontanelles iv. Sleep h. Musculoskeletal system i. Bone growth ii. Muscle weight i. Dental system j. Growth and development in infants (rapid changes over first year) 2. Psychosocial development a. Family processes / reciprocal socialization i. Scaffolding ii. Attachment iii. Trust versus mistrust iv. Secure attachment b. Temperament i. Easy child ii. Difficult child iii. Slow to warm-up child c. Crying i. Basic cry ii. Anger cry iii. Pain cry d. Trust e. Situational crisis i. Protest ii. Despair iii. Withdrawal f. Growth charts
5.1.2 – Toddler (12 Months to 36 Months) and Pre-School Age (Three to Five Years)	

C 5.1.1.2 - Discuss the physiological and psychosocial characteristics of toddlers and pre-school age children.	1. Physiological a. Vital signs i. Heart rate ii. Respiratory rate iii. Systolic blood pressure iv. Temperature b. Weight c. Cardiovascular system d. Pulmonary system e. Renal system f. Immune system g. Nervous system h. Musculoskeletal system i. Dental system j. Elimination patterns (toilet training) k. Sensory 2. Psychosocial a. Cognitive b. Play c. Sibling relationships d. Peer group functions e. Parenting styles and its effect on children i. Authoritarian parenting ii. Authoritative parenting iii. Permissive-indifferent parenting iv. Permissive-indulgent parenting f. Divorce effects on child development g. Television h. Modeling
5.1.3 – School Age Children (Six to 12 Years)	
C 5.1.3.1 - Discuss the physiological and psychosocial characteristics of school age children.	1. Physiological a. Vital signs i. Heart rate ii. Respiratory rate iii. Systolic blood pressure iv. Temperature b. Growth rate c. Bodily functions 2. Psychosocial a. Families b. Develop self-concept c. Moral development i. Pre-conventional reasoning ii. Conventional reasoning iii. Post-conventional reasoning iv. Individuals move through development at different rates
5.1.4 – Adolescence (13 to 18 Years)	
C 5.1.3.1 - Discuss the physiological and psychosocial characteristics of adolescents.	1. Physiological a. Vital signs i. Heart rate ii. Respiratory rate iii. Blood pressure

	iv. Temperature b. Growth rate i. Secondary sexual development occurs ii. Endocrine changes 1. Female 2. Male iii. Reproductive maturity iv. Muscle mass and bone growth v. Body fat vi. Blood chemistry nearly equal to adult levels vii. Skin toughens 2. Psychosocial a. Family b. Develop identity c. Ethical development
5.1.5 – Early Adulthood (19 to 40 Years)	
C 5.1.5.1 - Discuss the physiological and psychosocial characteristics of individuals in early adulthood.	1. Physiological – Vital signs a. Heart rate b. Respiratory rate c. Blood pressure d. Temperature 2. Psychosocial
5.1.6 – Middle Adulthood (41 to 60 Years)	
C 5.1.6.1 - Discuss the physiological and psychosocial characteristics of individuals in middle adulthood.	1. Physiological a. Vital signs i. Heart rate ii. Respiratory rate iii. Blood pressure iv. Temperature b. Varying degrees of degradation c. Vision d. Hearing e. Cardiovascular health i. Cardiac output ii. Cholesterol f. Cancer g. Weight control h. Menopause 2. Psychosocial a. Social clock b. Approach to problems c. Empty-nest syndrome d. Often burdened by financial commitments
5.1.7 – Late Adulthood (61 Years and Older)	
C 5.1.7.1 - Discuss the physiological and psychosocial characteristics of individuals in late adulthood.	1. Physiological a. Vital signs i. Heart rate ii. Respiratory rate status iii. Blood pressure iv. Temperature b. Life span

c. Life expectancy
d. Cardiovascular function changes
    i. Blood vessels
    ii. Heart
    iii. Blood cells
e. Respiratory system
f. Endocrine system changes
g. Gastrointestinal system
h. Renal system
i. Sensory changes
j. Nervous system

2. Psychosocial
    a. Terminal drop hypothesis
    b. Wisdom attributed to age in some cultures
    c. Challenges
        i. Self-worth
        ii. Declining well-being
        iii. Financial burdens

6.0 – Public Health

Applies fundamental knowledge of principles of public health and epidemiology including public health emergencies, health promotion, and illness and injury prevention.

6.1 – Public Health

Objective	Educational Standard
6.1.1 – Basic Principles of Public Health	
C 6.1.1.1 – Discuss role of public health in our society.	1. Many definitions 2. Public health mission and functions 3. Public health differs from individual patient care 4. Review accomplishments of public health a. Widespread vaccinations b. Clean drinking water and sewage systems c. Declining infectious disease d. Fluoridated water e. Reduction in use of tobacco products f. Prenatal care g. Others
C 6.1.1.2 – Discuss public health laws, regulations, and guidelines.	N/A
C 6.1.1.3 – Examine how EMS interfaces with public health.	1. Health prevention and promotion a. Primary prevention (preventing disease development) i. Vaccination ii. Education b. Secondary prevention (preventing the complications and/or progression of disease) c. Health screenings 2. Disease surveillance a. EMS providers are first-line care providers b. Patient care reports may provide information on epidemics of disease 3. Injury prevention a. Safety equipment b. Education i. Car seat safety ii. Seat belt use iii. Helmet use iv. Driving under the influence v. Falls vi. Fire vii. Injury surveillance

7.0 – Pharmacology

Integrates comprehensive knowledge of pharmacology to formulate a treatment plan intended to mitigate emergencies and improve the overall health of the patient.

7.1 – Principles of Pharmacology

Objective	Educational Standard
7.1.1 – Medication Safety	
C 7.1.1.1 – Describe the importance of medication safety in providing quality EMS care.	N/A
7.1.2 – Medication Legislation	
C 7.1.2.1 – Describe legislative acts controlling drug use and abuse in the United States.	1. Pure Food and Drug Act 2. Federal Food, Drug, and Cosmetic Act 3. Harrison Narcotic Act 4. Controlled Substances Act a. Schedule I b. Schedule II c. Schedule III d. Schedule IV e. Schedule V 5. Drug Enforcement Agency 6. Development of Pharmaceuticals a. Food and Drug Administration approval process b. Special considerations i. Pregnancy ii. Pediatrics iii. Geriatrics
7.1.3 – Naming	
C 7.1.3.1 – Differentiate between the chemical, generic (nonproprietary), official (USP), and trade (proprietary) names of a drug.	1. Chemical 2. Generic 3. Proprietary/Trade 4. Official
C 7.1.3.2 – List authoritative sources of drug information.	1. United States Pharmacopeia (“USP”) 2. Physician’s Drug Reference (“PDR”) 3. Drug Package Inserts 4. Drug Handbooks 5. AMA Drug Evaluation 6. Hospital Formulary (“HF”)
7.1.4 – Classifications	
C 7.1.4.1 – List the classifications of drugs based upon either mechanism of action or the body system affected.	1. Body system 2. Class of agent 3. Mechanism of Action a. Alkalinizing agents b. Analgesics c. Antibiotics d. Anticonvulsant (sedative) e. Antihypertensives f. Beta-agonists

g. Beta-blockers
h. Calcium channel blockers
i. Corticosteroids
j. Diuretics
k. Dysrhythmics
l. Fibrinolytics
m. Neuromuscular blocking agents
n. Platelet inhibitors
o. Sympathomimetics
p. Xanthines

4. Classification by body system
   a. Central nervous system
      i. Autonomic pharmacology
         1. Cholinergics
         2. Anticholinergics
         3. Adrenergics
         4. Antiadrenergic
      ii. Analgesics
      iii. Anesthetics
      iv. Paralytics
      v. Sedative/hypnotic
      vi. Anticonvulsants
      vii. Stimulants
   b. Cardiovascular drugs
      i. Anti-dysrhythmic
      ii. Cardiac glycosides
      iii. Antihypertensives
      iv. Antianginal
      v. Antihyperlipidemic
      vi. Antihistamine
   c. Drugs affecting the blood
      i. Anticoagulants
      ii. Fibrinolytics
      iii. Antihemophilic
      iv. Platelet inhibitors
      v. Glycoprotein IIB/IIIA receptor blockers
      vi. Hemostatic
      vii. Antihyperlipidemic
   d. Psychiatric medications
      i. Neuroleptics
      ii. Antidepressants
      iii. Antimanic
   e. Respiratory system
      i. Mucolytics
      ii. Cholinergic antagonists
      iii. Sympathomimetics
      iv. Xanthine derivatives
      v. Cough suppressants
      vi. Nasal decongestants
      vii. Antihistamines
   f. Endocrine system
      i. Drugs affecting the pituitary gland
         1. Anterior pituitary hormones
         2. Posterior pituitary hormones
      ii. Drugs affecting the thyroid gland

	iii. Drugs affecting the adrenal cortex 1. Glucocorticoids 2. Mineralcorticoids 3. Adrenal steroid inhibitors iv. Drugs affecting the pancreas 1. Insulin preparations 2. Oral hypoglycemic agents 3. Hyperglycemic agents g. Infectious disease i. Antihelmintic agents ii. Antiparasitic agents iii. Antifungal agents iv. Antibiotics v. Antiviral h. Immune system i. Immunosuppressants ii. Immunomodulators i. Gastrointestinal system i. Antacid ii. Antiflatulents iii. Digestants iv. Antiemetics v. Emetic agents vi. H2 receptor antagonists vii. Laxatives viii. Antidiarrheals ix. Cholesterol synthesis j. Urinary system – Diuretic drugs k. Reproductive system i. Contraceptives ii. Replacement hormone therapies iii. Erectile dysfunction iv. Oxytocics v. Premature labor inhibitors l. Ophthalmic drugs i. Antiglaucoma agents ii. Mydriatric agents iii. Antiinfective agents iv. Topical anesthetic agents m. Neoplastic diseases i. Alkylating agents ii. Antimetabolites iii. Plant alkaloids iv. Antitumor antibiotic n. Herbal preparations o. Over-the-counter medications
7.1.5 – Schedules	
C 7.1.5.1 – Differentiate between the substances included in Schedules I through V of the Controlled Substances Act.	1. Schedule I 2. Schedule II 3. Schedule III 4. Schedule IV 5. Schedule V
7.1.6 – Drug Storage and Security	
C 7.1.6.1 – Discuss factors affecting drug	1. Temperature

potency.	2. Light 3. Moisture 4. Shelf life
C 7.1.6.2 – Discuss considerations for storing and securing medications and controlled substances.	1. Storage 2. Accountability
7.1.8 – Phases of Medication Activity	
C 7.1.8.1 – List the phases of medication activity.	N/A
7.1.9 – Medication Interactions	
C 7.1.9.1 – Describe various medication interactions.	1. Intestinal absorption 2. Competition for plasma protein binding 3. Biotransformation 4. Drug metabolism 5. Renal excretion 6. Drug-drug interaction
7.1.10 – Toxicity	
C 7.1.10.1 – Describe toxicity concerns regarding medication administration.	N/A
7.1.11 – Drug Terminology	
C 7.1.11.1 – Define pertinent terms related to EMS utilization and administration of drugs.	1. Antagonism 2. Bolus 3. Contraindications 4. Cumulative action 5. Depressant 6. Habituation 7. Hypersensitivity 8. Idiosyncrasy 9. Indication 10. Potentiation 11. Refractory 12. Side effects 13. Stimulant 14. Synergism 15. Therapeutic action 16. Tolerance 17. Untoward effect
7.1.12 – Sources of Drugs	
C 7.1.12.1 – List the four main sources of drug products.	1. Inorganic – Minerals 2. Organic a. Extracts b. Alkaloids 3. Chemical 4. Genetic
C 7.1.12.2 – List the physical forms of various drug products.	1. Liquids 2. Solids 3. Gases
7.1.13 – Pharmacological Concepts	
C 7.1.13.1 – Discuss the processes of pharmacokinetics and pharmacodynamics.	1. Pharmacokinetics a. Absorption i. Solubility ii. Bioavailability

iii. Mechanism of absorption
1. Diffusion
2. Osmosis
3. Filtration

b. Distribution
i. Drug reservoirs
1. Plasma protein binding
2. Tissue binding
ii. Barriers to drug distribution
1. Blood-brain barrier
2. Placental barrier

c. Biotransformation
i. First-pass metabolism
ii. Active metabolites
iii. Inactive metabolites

d. Metabolism and excretion – Organs of elimination
i. Kidneys
ii. Intestine
iii. Lungs
iv. Exocrine glands
1. Sweat
2. Salivary
3. Mammary

2. Pharmacodynamics
a. Mechanism of action
i. Drug receptor interaction
1. Agonists
2. Antagonists
3. Affinity
4. Efficacy
ii. Drug enzyme interaction

b. Medication response relationship
i. Plasma levels
ii. Biologic half-life
iii. Therapeutic threshold
iv. Therapeutic index
v. LD 50
vi. Factors altering drug response
1. Age
2. Gender
3. Body mass index
4. Pathologic state
5. Genetic factors
6. Time of administration
7. Psychological factors
8. Predictable responses
a. Tolerance
b. Cross tolerance
9. Iatrogenic responses
10. Drug allergy
11. Anaphylactic reaction
12. Delayed reaction (“serum sickness”)
13. Hypersensitivity
14. Idiosyncrasy

	15. Cumulative effect 16. Drug dependence 17. Drug antagonism 18. Summation (addition or additive effect) 19. Synergism 20. Potentiation 21. Interference 22. Toxicity

7.2 – Medication Administration

Objective	Educational Standard
7.2.1 – Routes of Administration	
C 7.2.1.1 – Differentiate between the percutaneous and parenteral routes of medication administration.	1. Alimentary tract a. Oral b. Sublingual c. Rectal 2. Parenteral a. Topical b. Intradermal c. Subcutaneous d. Intramuscular e. Intravenous i. IV bolus ii. IV piggyback f. Endotracheal g. Intraosseous h. Inhalational i. Intranasal
P 7.2.1.2 – Apply vascular access procedures.	1. Peripheral initiation 2. Initiation of IV at central line port 3. Central line monitoring 4. Blood / blood products (maintenance only) 5. Colloids 6. IV solutions a. D5W b. Normal Saline (0.9% NaCl) c. Lactated ringers 7. Intraosseous initiation (adult and pediatric) 8. Maintenance a. Medicated IV fluids b. Non-medicated IV fluids (D5W, NS, LR) 9. Venous blood sampling (obtaining)
7.2.2 – Administration of Medication to a Patient	
C 7.2.2.1 – Identify the six "rights" of drug administration.	1. Right patient (prescribed to the patient) 2. Right medication (patient condition) 3. Right route (patient condition) 4. Right dose (prescribed to patient) 5. Right time (within expiration date) 6. Right documentation
P 7.2.2.2 – Demonstrate proficiency in calculating drug dosages.	1. System of weights and measures – Metric system a. Prefixes b. Conversions 2. Drug calculations a. Desired dose b. Concentration on hand c. Volume on hand 3. Calculate a. Volume-based bolus b. IV drip rate c. Weight-based IV bolus d. Weight-based IV drip

C 7.2.2.3 – Explain the proper technique for administering medications via various routes (include advantages and disadvantages associated with each route).	1. Peripheral venous cannulation 2. Intraosseus 3. Intramuscular (manual) 4. Subcutaneous (manual) 5. Aerosolized 6. Nebulized 7. Sublingual 8. Intranasal 9. Transtracheal 10. Intravenous push/infusion 11. Nasogastric 12. Rectal 13. Topical 14. Accessing implanted/central intravenous port
C 7.2.2.4 – Explain the need for patient reassessment after medication administration.	1. Data (indications for medication) 2. Action (Medication administered) 3. Response (effect of medication)
C 7.2.2.5 – Describe the need for proper documentation of medication administration activities.	N/A
P 7.2.2.6 – Apply appropriate use of pharmacology.	N/A
P 7.2.2.7 – Administer medications.	1. Medication administration routes (WI) a. Aerosolized/nebulizer b. Auto-injector c. Endotracheal tube (“ET”) d. Intramuscular (“IM”) e. Intranasal (“IN”) f. Intraosseous (“IO”) g. Intravenous (“IV”) Piggyback h. Intravenous (“IV”) Push i. Oral j. Rectal k. Subcutaneous (“SQ”) l. Sub-lingual (“SL) m. Buccal (non-WI) n. Nasogastric (“NG”) o. Topical 2. Patient-assisted medications 3. Eye irrigation / Morgan lens 4. Approved medications by protocol (WI) a. Activated charcoal b. Albuterol (nebulized – unit dose) c. Aspirin (“ASA”) for chest pain d. Atrovent (nebulized – unit dose) e. Dextrose 50% f. Epinephrine auto-injector or manually drawn 1:1,000 g. Glucagon h. Mark I (or equivalent) auto-injector (for self and crew) i. Narcan j. Nitroglycerin (SL only) k. Oral glucose

	l. Other short-acting beta agonist for asthma (nebulized – unit dose) m. Physician (medical director) approved n. Thrombolytic therapy (monitoring) o. Nitrous oxide (non-WI) p. Pharmacologic sedation/restraint
7.2.3 – Standardization of Drugs	
C 7.2.3.1 – Discuss standardization of drugs.	1. Techniques to assure purity and potency 2. Generic drugs
7.2.4 – Medication Classifications	
C 7.2.4.1 – Describe how drugs are classified.	1. Phlebotomy – Procedure 2. Transfusion – Indications a. Transfusion reactions b. Hemolytic reaction c. Fever reaction

7.3 – Emergency Medications

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

Objectives	Educational Standard
7.3.1 – Specific Medications	
C 7.3.1.1 – List the names, mechanism of action, indications, contraindications, complications, routes of administration, side effects, interactions, doses, and any specific administration considerations for medications and intravenous fluids available for administration within the paramedic scope of practice.	1. Activated Charcoal 2. Adenosine 3. Albuterol 4. Amiodarone 5. Amyl Nitrite 6. Aspirin 7. Atropine 8. Dextrose (50%, 25%, 10%) 9. Diazepam 10. Diltiazem 11. Diphenhydramine HCl 12. Dopamine 13. Epinephrine 14. Fentanyl 15. Glucagon 16. Intravenous Fluids a. Dextrose 5% in water b. Normal saline c. Lactated ringer's 17. Ipratropium 18. Lidocaine 19. Lorazepam 20. Magnesium 21. Midazolam 22. Morphine 23. Naloxone 24. Nitroglycerin a. Paste b. Spray c. Tablets 25. Nitrous Oxide 26. Oxygen 27. Oxytocin 28. Promethazine HCl 29. Thiamine

8.0 – Airway Management, Respiration, and Artificial Ventilation

Integrates complex knowledge of anatomy, physiology, and pathophysiology into the assessment to develop and implement a treatment plan with the goal of assuring a patent airway, adequate mechanical ventilation, and respiration for patients of all ages.

8.1 – Airway Management

Objective	Educational Standard
8.1.1 – Airway Anatomy	
C 8.1.1.1 – Describe the anatomy of the respiratory system.	1. Sinuses a. Fontal b. Sphenoid c. Ethmoid d. Maxillary 2. Upper airway tract a. Nose b. Mouth and oral cavity c. Jaw d. Pharynx i. Nasopharynx ii. Oropharynx iii. Hypopharynx iv. Laryngopharynx – Vallecula – Pyriform sinus e. Larynx i. Cartilages 1. Epiglottis 2. Arytenoid cartilage a. Corniculate cartilage b. Cuneiform cartilage c. Posterior arytenoids 3. Vocal cords a. False vocal cord b. True vocal cord 4. Thyroid cartilage 5. Cricoid ring a. Arch of cricoid cartilage b. Lamina of cricoid cartilage c. Cricothyroid membrane (ligament) ii. Bone – Hyoid bone – Hyo-epiglottic ligament 3. Jugular notch 4. Lower airway tract a. Trachea (spatial relationship to esophagus) b. Carina (Angle of Louis) c. Bronchi d. Lungs i. Bronchioles

	1. Bronchial smooth muscle 2. $Beta_2$ adrenergic receptors ii. Pulmonary cilia iii. Alveoli (surfactant) 5. Support structures a. Chest cage i. Ribs ii. Muscles of respiration 1. Intercostal muscles 2. Diaphragm iii. Pleura 1. Parietal pleura 2. Visceral pleura b. Phrenic nerve c. Mediastinum
8.1.2 – Airway Assessment	
C 8.1.2.1 – Describe assessment of the airway and the respiratory system.	1. Purpose a. Identify inadequate airway b. Identify an unstable airway c. Identify potentially difficult airways 2. Procedure a. Gag reflex b. Airway obstruction i. Soft tissue obstruction ii. Foreign bodies iii. Complete and incomplete iv. Upper versus lower c. Work of breathing d. Laryngospasm e. Laryngeal edema f. Penetrating injuries 3. Anticipating the difficult airway a. Trauma/bleeding b. Vomiting c. History d. Mouth opening e. Mandibular length f. Mallampati classifications g. Obstructions h. Neck mobility i. Facial hair
8.1.3 – Techniques of Assuring a Patent Airway	
C 8.1.3.1 – Describe indications, contraindications, advantages, disadvantages, complications, equipment, and techniques used to ensure a patent airway.	1. Manual airway maneuvers 2. Mechanical airway devices 3. Relief of foreign body airway obstruction a. Refer to current American Heart Association guidelines b. Removal of foreign body airway obstructions using direct laryngoscopy i. Purpose ii. Indications iii. Contraindications iv. Complications

	v. Procedure vi. Limitation c. Airway suctioning – Tracheobronchial suctioning i. Purpose ii. Indications iii. Contraindications iv. Complications v. Procedure vi. Limitation 4. Blind insertion airway devices 5. Endotracheal intubation a. Direct laryngoscopy (visualized) i. Purpose ii. Indications iii. Contraindications iv. Complications v. Procedure (including confirmation techniques) vi. Limitations b. Non-visualized i. Nasal 1. Purpose 2. Indications 3. Contraindications 4. Complications 5. Procedure (including confirmation techniques) 6. Limitations ii. Digital 1. Purpose 2. Indications 3. Contraindications 4. Complications 5. Procedure (including confirmation techniques) 6. Limitations iii. Lighted stylet 1. Purpose 2. Indications 3. Contraindications 4. Complications 5. Procedure (including confirmation techniques) 6. Limitations 6. Percutaneous cricothyrotomy a. Purpose b. Indications c. Contraindications d. Complications e. Procedure (including confirmation techniques) f. Limitations
P 8.1.3.2 – Apply airway management	1. Airway a. Lumen (non-visualized)

procedures (refer to Wisconsin Scope of Practice).	b. Nasal (nasopharyngeal) c. Oral (oropharyngeal) 2. Bag valve mask ("BVM") 3. Chest decompression (needle) 4. CO monitoring 5. CPAP / BiPAP 6. PEEP 7. Cricoid pressure (Sellick's maneuver) 8. Cricothyrotomy (surgical/needle) 9. End tidal CO_2 monitoring 10. Gastric decompression (NG tube) 11. Intubation a. Lighted stylet b. Medication assisted (non-paralytic) c. Medication assisted with paralytics (RSI) d. Nasotracheal e. Endotracheal 12. Manual airway maneuvers a. Heat-tilt, chin-lift b. Jaw thrust c. Modified jaw thrust 13. Obstruction a. Forceps and laryngoscope (direct visual) b. Manual 14. Oxygen therapy a. Nebulizer b. Nasal cannula c. Non-rebreather mask d. Simple face mask e. Humidifier f. Partial rebreather g. Venturi mask h. Regulators 15. Pulse oximetry 16. Suctioning a. Tracheobronchial b. Upper airway (soft and rigid) 17. Ventilators a. Demand valve (manually triggered ventilation) b. Automated transport ("ATV") 18. Chest tube monitoring
8.1.4 – Consider Age-Related Variations in Pediatric and Geriatric Patients	
C 8.1.4.1 – Compare ventilation techniques used for an adult patient to those used for pediatric patients.	N/A
C 8.1.4.2 – Describe special considerations in airway management and ventilation for the pediatric patient.	N/A

8.2 – Respiration

Objective	Educational Standard
8.2.1 – Anatomy of the Respiratory System	
C 8.2.1.1 – See 8.1.1	N/A
8.2.2 – Physiology of Respiration	
C 8.2.2.1 – Discuss the means by which the body controls respiration.	1. Nervous control of respiration a. Medulla oblongata i. Ventral respiratory group ii. Dorsal respiratory group iii. Reticular activating system b. Innervation of the respiratory musculature i. Spinal cord innervation ii. Phrenic nerve iii. Hering-Breuer reflex c. Conscious control of respiration – Somatic nerves related to intercostal innervation d. Chemical control of respiration - Chemoreceptors
C 8.2.2.2 – Explain the mechanics of respiration.	1. Pulmonary ventilation a. Movement of the thoracic wall i. Vertical diameter ii. Transverse diameter iii. Anteroposterior diameter b. Intrathoracic pressure gradients i. Boyle's Law ii. Inspiration iii. Expiration c. Phases of ventilation i. Active phase ii. Passive phase d. Modes of breathing i. Quiet breathing ii. Forced breathing e. Lung volumes and capacities i. Volumes 1. Tidal volume 2. Minute volume 3. Residual volume 4. Dead space volume ii. Capacities 1. Total lung capacity 2. Vital capacity iii. Maximum inspiratory force iv. Maximum expiratory force v. Significance of pulmonary volumes and capacities 2. Gas exchange a. Mixed gases in ambient air b. Partial pressures i. Henry's Law ii. PaO_2 iii. PCO_2

	c. Oxygenation d. Alveolar air versus atmospheric air e. Respiration i. Internal versus external respiration ii. Diffusion of gases through respiratory membrane iii. Diffusion of gases from capillaries to cells 1. Role of ATP in cellular function 2. Aerobic metabolism 3. Anaerobic metabolism 3. Gas transport a. Red blood cells i. Hemoglobin chemistry ii. Hematocrit b. Oxygen-hemoglobin dissociation curve 4. Ventilation perfusion ratio a. Anatomical shunts b. Blood flow across the alveoli
C 8.2.2.3 – Identify blood volume circulation disturbances due to cardiac, trauma, or systemic vascular resistance.	1. Orthostatic hypotension 2. Oncotic fluid pressure 3. Hydrostatic fluid pressure 4. Capacitance of the venules and veins
C 8.2.2.4 – Describe cardiac output and its role in adequate circulation maintenance.	1. Cardiac rate a. Tachycardia b. Bradycardia 2. Stroke volume a. End-diastolic volume b. Preload 3. Role of alpha stimulation in the heart 4. Role of beta stimulation in the heart 5. Atrioventricular synchronization 6. Total peripheral resistance a. Precapillary arterioles and smooth muscle effects of alpha and beta cholinergic receptors, effects of hypoxia, acidosis, temperature changes, neural factors, and catecholamines. b. Cell and tissue beds and disruptions of membrane integrity, enzyme systems, and acid-base balance.
C 8.2.2.5 – Discuss respiratory buffer systems.	1. Blood 2. Respiratory 3. Renal
8.2.3 – Pathophysiology of Respiration	
C 8.2.3.1 – List reasons for interruption of pulmonary ventilation.	1. Interruption of nervous control a. Drugs b. Trauma c. Muscular dystrophy d. Poliomyelitis e. Neuromuscular junction blocking agents 2. Structure damage to the thorax 3. Bronchoconstriction 4. Disruption of airway patency

	a. Infection b. Trauma/burns c. Foreign body obstruction d. Allergic reaction e. Unconscious (loss of airway tone)
C 8.2.3.2 – Discuss causes for interruption of oxygenation.	N/A
C 8.2.3.3 – List reasons for inadequate respiration.	1. External a. Deficiencies due to environmental factors i. Altitude ii. Closed environments iii. Toxic or poisonous environments b. Carbon dioxide retention 2. Internal a. Pathology typically related to changes in alveolar-capillary gas exchange b. Typical disease processes i. Emphysema ii. Pulmonary edema iii. Pneumonia iv. Environmental/occupational exposure v. Drowning c. Cellular
C 8.2.3.4 – Discuss rapid ventilation, exhaustion, and dead space air movement as contributory factors for inadequate respiration.	N/A
C 8.2.3.5 – Identify possible mechanical ventilation problems resulting in inadequate respiration.	Moving noncompliant lungs.
C 8.2.3.6 – Discuss concerns regarding breathing against an elevated diaphragm.	N/A
C 8.2.3.7 – Discuss pneumonia, emphysema, and trauma as they relate to a decrease in lung compliance.	N/A
C 8.2.3.8 – Discuss the concept of ventilation-perfusion mismatch.	1. Ventilation defects a. Pulmonary edema b. Pneumonia c. Atelectasis d. Obstruction due to mucus plugs e. Increased dead space ventilation due to emphysema 2. Perfusion defects a. Pulmonary emboli b. Disruption of the normal chest architecture
C 8.2.3.9 – Discuss disruptions in oxygen transport associated with diminished oxygen carrying capacity.	1. Anemia 2. Blood loss
C 8.2.3.10 – List causes for disruption in effective circulation.	1. Shock a. Blood loss b. Diminished peripheral resistance c. Cardiac failure 2. Emboli

	3. Increased capillary permeability
C 8.2.3.11 – Identify disruptions that can occur at the cellular level to impede adequate respiration.	1. Acid-base balance 2. Poisons/toxins 3. Blood sugar changes 4. Hormone effects 5. Drugs 6. Hypoxia
8.2.4 – Assessment of Adequate and inadequate Respiration	
C 8.2.4.1 – Discuss the use of capnometry/capnography to assess adequate or inadequate respiration.	1. Purpose/definition 2. Indications 3. Contraindications 4. Complications 5. Procedure
8.2.5 – Management of Adequate and Inadequate Respiration	
C 8.2.5.1 – Discuss the maintenance of adequate respiration given a respiratory compromise.	1. Assure an adequate airway 2. Review supplemental oxygen therapy 3. Continuous Positive Airway Pressure ("CPAP") / Bi-Level Positive Airway Pressure ("BiPAP") a. Definitions/purpose i. CPAP – Device to provide continuous positive airway pressure in the spontaneously breathing patient ii. BiPAP – Device to provide differential positive airway pressure in the spontaneously breathing patient 1. Higher positive pressure during inspiration (e.g., 10 cm water pressure) 2. Lower positive pressure during expiration (e.g., 5 cm water pressure) 3. Augments patient's spontaneous breathing with positive pressure ventilation during inspiration iii. Increase lung compliance iv. Reduce alveolar collapse v. Increase laminar airflow vi. Decrease intubation rates b. Indications i. CHF/acute pulmonary edema ii. COPD/asthma iii. Near drowning iv. Similar equipment may be used for home treatment of sleep apnea c. Contraindications – Inability to tolerate mask d. Complications i. Requires adequate tidal volume ii. Patient must be alert and able to follow instructions iii. Patient must tolerate mask iv. Gastric insufflation

	v. Vomiting and aspiration risk vi. Barotrauma vii. Facial hair viii. Dysmorphic faces e. Procedure 4. Assisted positive pressure ventilations a. Purpose/definition b. Indications c. Contraindications d. Complications e. Procedure
8.2.6 – Supplemental Oxygen Therapy	
C 8.2.6.1 – Discuss oxygen administration for the patient with hypercapnia.	N/A
8.2.7 – Age-Related Variations in Pediatric and Geriatric Patients	
C 8.2.7.1 – Describe special considerations in airway management and ventilation for pediatric patients.	N/A

8.3 – Artificial Ventilation

Objective	Educational Standard
8.3.1 – Comprehensive Ventilation Assessment	
C 8.3.1.1 – Explain the purpose of conducting a comprehensive ventilation assessment.	N/A
C 8.3.1.2 – Describe the procedures inherent in conducting a comprehensive ventilation assessment.	N/A
C 8.3.1.3 – Define minute volume.	N/A
C 8.3.1.4 – Define alveolar volume.	N/A
C 8.3.1.5 – Describe the process of, and tools used in, evaluating the effects of artificial ventilation.	1. Pulse oximetry a. Purpose b. Indications c. Contraindications d. Complications e. Procedure 2. Blood gas analysis a. pH b. $PaCO_2$ c. PaO_2 d. Bicarbonate e. Base deficit 3. Capnography review a. Purpose b. Indications c. Contraindications d. Complications e. Procedure
8.3.2 – Review of Ventilation Devices Used by EMRs, EMTs, and AEMTs	
C 8.3.2.1 – Discuss the ventilation devices included within the scopes of practice for the EMR, EMT, and AEMT levels.	1. Manual devices a. Purpose b. Indications c. Contraindications d. Complications e. Procedures 2. Mechanical devices a. Purpose b. Indications c. Contraindications d. Complications e. Procedures
8.3.3. – Assisting Patient Ventilations	
C 8.3.3.1 – Discuss the techniques utilized by EMRs, EMTs, and AEMTs to assist patient ventilations.	1. Purpose 2. Indications 3. Contraindications 4. Complications 5. Procedures
C 8.3.3.2 – Differentiate between normal and positive ventilation and the physiologic	N/A

differences associated with each.	
C 8.3.3.3 – Discuss the use of BiPAP/CPAP in assisting patient ventilations.	1. Purpose 2. Indications 3. Contraindications 4. Complications 5. Procedures
C 8.3.3.4 – Discuss the use of PEEP in assisting patient ventilations.	1. Purpose a. Provide positive airway pressure to prevent alveolar collapse at the end of expiration b. Refers to positive pressure situations c. To increase lung compliance 2. Indications a. Hemodynamically stable patient receiving positive pressure ventilation i. COPD ii. CHF iii. Drowning b. Patient transfer 3. Contraindications 4. Complications a. Can diminish venous return b. Can cause barotrauma 5. Procedure
8.3.4 – Age-Related Variations in Pediatric and Geriatric Patients	
C 8.3.4.1 – Identify age-related variations in providing artificial ventilations to pediatric and geriatric patients.	N/A

9.0 – Patient Assessment

Integrates scene and patient assessment findings with knowledge of epidemiology and pathophysiology to form a field impression. This includes developing a list of differential diagnoses through clinical reasoning, modifying the assessment and formulating a treatment plan.

9.1 – Scene Size-Up

Objective	Educational Standard
9.1.1 – Scene Safety	
C 9.1.1.1 – Identify common scene hazards encountered by paramedics.	1. Environmental 2. Hazardous substances a. Chemical b. Biological 3. Violence a. Patient b. Bystanders c. Crime scenes 4. Rescue a. Motor vehicle collisions i. Extrication hazards ii. Roadway operation dangers b. Special situations
C 9.1.1.2 – Discuss the process of evaluating a scene for safety.	1. Scene Safe – Establish patient contact and proceed with patient assessment 2. Scene is not safe – Is it possible to quickly make the scene safe? a. Yes – Assess patient b. No – Do not enter any unsafe scene until minimizing hazards c. Request specialized resources immediately
9.1.2 – Scene Management	
C 9.1.2.1 – Discuss the impact of the environment on patient care.	1. Medical a. Determine the nature of illness b. Hazards at medical emergencies 2. Trauma a. Determine mechanism of injury b. Hazards at the trauma scene 3. Environmental considerations a. Weather or extreme temperatures b. Toxins and gases c. Secondary collapse and falls d. Unstable conditions
C 9.1.2.2 – Discuss techniques the paramedic could employ to address scene hazards.	1. Protect the patient a. After making the scene safe for the paramedic, the safety of the patient becomes the next priority b. If the paramedic cannot alleviate the conditions that represent a health or safety threat to the patient, move the patient to a

	safer environment 2. Protect the bystanders a. Minimize conditions that represent a hazard for bystanders b. If the paramedic cannot minimize the hazards, remove the bystanders from the scene 3. Request additional resources needed at the scene immediately a. Multiple patients (additional ambulances) b. Fire hazard (fire department) c. Traffic or violence issues (law enforcement) 4. Scan the scene for information related to: a. Mechanism of injury b. Nature of illness
C 9.1.2.3 – Discuss means by which the paramedic can protect himself or herself from on-scene violence.	1. Paramedics should not enter a scene or approach a patient if the threat of violence exists 2. Park away from the scene and wait for the appropriate law enforcement officials to minimize the danger
C 9.1.2.4 – Discuss instances in which additional or specialized resources may be necessary to mitigate on-scene hazards.	1. A variety of specialized protective equipment and gear is available for specialized situations a. Chemical and biological suits can provide protection against hazardous materials and biological threats of varying degrees b. Specialized rescue equipment may be necessary for difficulty or complicated extrications c. Ascent or descent gear may be necessary for specialized rescue situations 2. Only specially trained responders should wear or use the specialized equipment
C 9.1.2.5 – Discuss standard precautions utilized to protect patients and responders alike from transmissible infectious agents.	1. Overview a. Based on the principle that all blood, body fluids, secretions, excretions (except sweat), non-intact skin, and mucous membranes may contain transmissible infectious agents b. Include a group of infection prevention practices that apply to all patients, regardless of suspected or confirmed infection status, in any healthcare delivery setting c. Universal precautions were developed for protection of healthcare personnel d. Standard precautions focus on protection of patients 2. Implementation – The extent of standard precautions used is determined by the anticipated blood, body fluid, or pathogen exposure a. Handwashing b. Gloves c. Gowns d. Masks e. Protective eyewear

	3. Personal protective equipment a. Personal protective equipment includes clothing or specialized equipment that provides some protection to the wearer from substances that may pose a health or safety risk b. Wear PPE appropriate for the potential hazard i. Steel-toe boots ii. Helmets iii. Heat-resistant outerwear iv. Self-contained breathing apparatus v. Leather gloves
C 9.1.2.6 – Discuss scene management given multiple patients.	1. Number of patients and need for additional support. a. How many patients? b. Does the dispatch information suggest the need for additional support? c. Protection of the patient d. Protection of bystanders i. Remove ii. Isolate iii. Barricade 2. Need for additional resources a. Incident Command/Management System ("ICS" or "IMS") b. Consider if this level of commitment is required
P 9.1.2.7 – Coordinate scene safety.	N/A

9.2 – Primary Assessment

Objective	Educational Standard
9.2.1 – Primary Survey/Primary Assessment	
C 9.2.1.1 – List the criteria to be evaluated during the primary survey/assessment of a patient.	1. Initial general impression (based on the patient's age-appropriate appearance) a. Appears stable b. Appears stable, but potentially unstable c. Appears unstable 2. Level of consciousness a. Alert b. Responds to verbal stimuli c. Responds to painful stimuli d. Unresponsive (no gag or cough) 3. Airway status a. Unresponsive patient i. Open the airway ii. Clear any obstructions b. Responsive patient – Is the patient talking or crying? i. Yes – Assess for adequacy of breathing ii. No – Open airway 4. Breathing status a. Patient responsive i. Breathing is adequate (rate and quality) ii. Breathing is too fact (>24 breaths per minute) iii. Breathing is too slow (<8 breaths per minute) iv. Breathing is absent (choking) b. Patient unresponsive i. Breathing is adequate (rate and quality) ii. Breathing is inadequate iii. Breathing is absent 5. Circulatory status a. Radial pulse present (rate and quality) i. Normal rate ii. Fast iii. Slow iv. Irregular rate b. Radial pulse absent – Assess carotid pulse c. Assess if major bleeding is present d. Perfusion status i. Skin color ii. Skin temperature iii. Skin moisture iv. Capillary refill (as appropriate) 6. Disability (brief neurological evaluation) 7. Exposure (patient completely undressed) 8. Identifying life threats 9. Assessment of vital functions
A 9.2.1.2 – Demonstrate an understanding of basic patient needs.	N/A

P 9.2.1.3 – Demonstrate appropriate primary survey/assessment of a patient.	N/A
P 9.2.1.4 – Formulate field impression(s).	N/A
P 9.2.1.5 – Formulate a working diagnosis.	N/A
9.2.2 – Integration of Treatment/Procedures Needed to Preserve Life	
C 9.2.2.1 – Discuss the need to integrate treatment or procedures necessary to preserve life when performing a primary survey/assessment of a patient.	N/A
P 9.2.2.2 – Formulate patient treatment plan(s).	N/A
P 9.2.2.3 – Implement patient treatment plan(s).	N/A
9.2.3 – Evaluating Priority of Patient Care and Transport	
C 9.2.3.1 – Discuss the assignment of priority of patient care and transport based upon primary survey/assessment findings.	1. Stable 2. Potentially unstable 3. Unstable

9.3 – History Taking

Objective	Educational Standard
9.3.1 – Components of the Patient History	
C 9.3.1.1 – Describe the purpose of obtaining a patient history.	1. Problem-based history in pre-hospital environment 2. Emphasis on: a. Identifying life-threatening conditions that require immediate intervention b. Gives full attention to the needs of the moment c. Provides information leading to appropriate care for the urgent, emergent, and non-emergent patient requesting care 3. Expanded history when appropriate a. Opportunities for patient education b. Opportunities for service referral
C 9.3.1.2 – Discuss potential barriers to and techniques for obtaining a patient history.	1. Factors influencing communication 2. Language barriers 3. Listening 4. Techniques of questioning a. Open-ended questions b. Direct questions c. Leading questions
9.3.2 – Interviewing Techniques	
C 9.3.2.1 – Identify strategies for developing rapport with the patient ("setting the stage").	1. The environment a. Proper environment enhances communication b. Personal space 2. Interviewer demeanor and appearance a. Just as the interviewer is watching the patient, the patient will be watching the interviewer b. Messages of body language 3. Note taking a. Difficult to remember all details b. Most patients are comfortable with note taking i. If concerns arise, explain the purpose of the note taking ii. Do not divert attention from the patient to take notes
C 9.3.2.2 – Discuss interviewing techniques to assist in learning about the patient's present illness.	1. Greeting the patient a. Greet by name b. Avoid the use of unfamiliar or demeaning terms, such as granny, honey, etc. 2. The patient's comfort a. Be alert to patient comfort levels b. Inquire about the patient's feelings 3. Opening questions a. Find out why the patient is seeking medical care of advice b. Use a general, open-ended question c. Follow the patient's leads i. Facilitation 1. The interviewer's posture, actions, or words should encourage the patient to say more

	2. Making eye contact or saying phrases such as "go on" or "I'm listening" may help the patient to continue ii. Reflection 1. Repetition of the patient's words that encourage additional responses 2. Typically does not bias the story or interrupt the patient's train of thought iii. Clarification iv. Empathetic responses v. Confrontation vi. Interpretation vii. Asking about feelings 4. Obtaining more information – Attributes of a symptom a. Location i. Where is it ii. Does it radiate b. Quality c. Severity i. How bad is it ii. Attempt to quantify the pain 1. 1 to 10 scale 2. Other scales d. Timing i. When did it start ii. How long does it last e. The setting in which it occurs i. Emotional response ii. Environmental factors f. Factors that make it better or worse g. Associated manifestations
C 9.3.2.3 – Discuss the purpose of direct questions and the techniques employed in asking direct questions.	1. To gather additional information, direct questions may be required 2. Should not be leading questions 3. Ask one question at a time 4. Use language that is (age) appropriate
C 9.3.2.4 – Discuss considerations in obtaining a history pertaining to sensitive topics.	1. Alcohol and drugs 2. Physical abuse or violence 3. Sexual history
C 9.3.2.5 – Identify considerations pertaining to obtaining a history in trauma patients.	1. Focuses on general underlying health a. Special emphasis on conditions contributing to morbidity and mortality in trauma b. Current medications c. Allergies 2. Special attention on systems impacted by the traumatic event
9.3.3 – Components of the Patient History	
C 9.3.3.1 – Identify the components of a patient history.	1. Chief complaint a. Brief statement of why the patient is seeking healthcare b. Should include what is wrong and why

treatment is sought
2. Present problem
   a. Provides a full, clear, chronological account of the symptoms (OPQRST)
      i. Onset
      ii. Provocation/palliation
      iii. Quality of pain and/or associated symptoms
      iv. Radiation of pain
      v. Severity of pain symptoms
      vi. Timing
   b. State of health just prior to first onset of symptoms
3. Past medical history
   a. General state of health
      i. Current medications
      ii. Allergies
   b. Childhood illnesses
   c. Adult illnesses
   d. Accidents and injuries
   e. Past surgery
   f. Hospitalization
   g. Physical disability due to previous illness or injury
   h. Emotional status
4. Family history or blood relatives with:
   a. Similar symptoms
   b. Risk factor assessment of family diseases
5. Personal social history as it relates to illness risk factors
   a. Smoking, drinking, drug use
   b. Diet
   c. Sexual habits
   d. Occupation
   e. Environment
   f. Travel
6. Review of body systems
   a. Questions should be selected based on patient's chief complaint and present problem
   b. General symptoms
      i. Fever
      ii. Chills
      iii. Malaise
      iv. Fatigue
      v. Night sweats
      vi. Weight variations
   c. Skin, hair, and nails
      i. Rashes
      ii. Itching
      iii. Sweating
   d. Musculoskeletal
      i. Joint pain
      ii. Loss of motion
      iii. Swelling
      iv. Redness

v. Heat or deformity
e. Head and neck
i. General: headache, loss of consciousness
ii. Eyes
1. Visual acuity
2. Blurring
3. Diplopia
4. Photophobia
5. Pain
6. Changes in vision
7. Flashing
iii. Ears
1. Hearing loss
2. Pain
3. Discharge
4. Tinnitus
5. Vertigo
iv. Nose
1. Sense of smell
2. Rhinorrhea
3. Obstruction
4. Epistaxis
5. Postnasal discharge
6. Sinus pain
v. Throat and mouth
1. Sore throat
2. Bleeding
3. Pain
4. Dental issues
5. Ulcers
6. Changes in taste sensation
vi. Endocrine
1. Thyroid enlargement
2. Temperature intolerance
3. Skin changes
4. Swelling of hands and feet
5. Weight changes
6. Polyuria
7. Polydipsia
8. Polyphagia
9. Changes in body and facial hair
10. Males:
a. Erectile dysfunction
b. Emissions
c. Testicular pain
11. Females:
a. Menstrual regularity
b. Last menstrual period
c. Dysmenorrheal
d. Discharge
e. Bleeding
f. Pregnancies
g. Contraception use
vii. Chest and lungs
1. Dyspnea

2. Cough (productivity and description)
3. Wheezing
4. Hemoptysis
5. TB status

viii. Heart and blood vessels – Chest pain
1. Onset
2. Duration
3. Quality
4. Provocation
5. Palliation
6. Palpitations
7. Orthopnea
8. Edema
9. Past cardiac evaluation and tests

ix. Hematologic
1. Anemia
2. Bruising
3. Fatigue

x. Lymph nodes
1. Enlarging
2. Tenderness

xi. Gastrointestinal
1. Appetite
2. Digestion
3. Food allergies or intolerance
4. Heartburn
5. Nausea of vomiting
6. Diarrhea
7. Hematemesis
8. Bowel regularity
9. Stool changes
10. Flatulence
11. Jaundice
12. Past GI evaluation and tests

xii. Genitourinary
1. Dysuria
2. Pain (flank or suprapubic)
3. Frequency
4. Urgency
5. Nocturia
6. Hematuria
7. Polyuria
8. STDs

xiii. Neurologic
1. Seizure
2. Syncope
3. Loss of sensation
4. Weakness
5. Paralysis
6. Loss of coordination or memory
7. Twitches
8. Tremors

xiv. Psychiatric
1. Depression
2. Mood changes

	3. Difficulty concentrating 4. Anxiety 5. Suicidal or homicidal ideation 6. Irritability 7. Sleep disturbances 8. Fatigue on waking 7. Clinical reasoning a. Requires use of knowledge of anatomy, physiology, and pathophysiology to direct the questioning i. Answers are analyzed as they are received ii. Results of questioning may allow you to think about associated problems and body systems iii. Clinical reasoning requires integrating the history with the physical assessment findings b. Start with broad possibility of systems that could contribute to patient's complaint i. Consider the chief complaint ii. Current symptoms iii. Past medical history iv. Identify any abnormal symptoms and physical findings v. Analyze the findings by anatomical location vi. Interpret the findings in terms of pathological process c. Narrow possible systems involved i. Develop a working hypothesis of the nature of the problem (differential diagnosis) ii. Test differential diagnosis list with questions and assessments relating to systems with similar types of signs and symptoms iii. Pay careful attention to the signs and symptoms that do not fit with the working differential diagnosis 8. Concluding questions a. Wrapping up the history b. Assuring that all the patient's issues have been addressed
9.3.4 – Cultural Competence	
C 9.3.4.1 – Discuss cross-cultural interviewing considerations.	1. Definition of culture 2. Developing cultural sensitivity 3. Impact of culture a. Ethnic culture b. Drugs c. Poverty d. Age 4. Definitions in cultural discussion 5. Questions specific to cultural impact a. What does the patient think caused the problem b. Why does the patient think it started when it did 6. Cultural orientations

	7. Cultural impact on disease 8. Religious beliefs that impact patient care 9. Cultural characteristics related to health care 10. Dietary practices 11. Family relationships
9.3.5 – Special Challenges	
C 9.3.5.1 – Discuss special challenges in obtaining a patient history.	1. Silence a. Silence is often uncomfortable b. Silence has meaning and many uses i. Patients may use this to collect their thoughts, remember details, or decide whether or not they trust the paramedic ii. Be alert for nonverbal clues of distress c. Silence may be a result of the interviewer's lack of sensitivity 2. Overly talkative patients a. Faced with a limited amount of time, interviewers may become impatient b. Although there are no perfect solutions, several techniques may be helpful i. Give the patient free reign for the first several minutes ii. Summarize frequently 3. Patients with multiple symptoms 4. Anxious patients a. Anxiety is natural b. Be sensitive to nonverbal clues 5. Reassurance a. It is tempting to be overly reassuring b. Premature reassurance blocks communication 6. Anger and hostility a. Understand that anger and hostility are natural b. Do not become angry in return 7. Intoxication a. Be accepting, not challenging b. Do not attempt to have the patient lower their voice or stop cursing; this may aggravate the patient 8. Crying a. Crying, like anger and hostility, may provide valuable insight b. Be sympathetic 9. Depression – Be alert for signs of depression 10. Confusing behaviors or histories a. Be prepared for the confusion and frustration of varying behaviors and histories b. Be alert for mental illness, delirium, or dementia 11. Limited intelligence a. Do not overlook the ability of these patients to provide the paramedic with adequate information b. Be alert for omissions 12. Language barriers a. Take every possible step to find a translator

	i. Appropriateness of the translator ii. Confidentiality issues b. A few broken words are not an acceptable substitute 13. Hearing problems a. Very similar to patients with a language barrier b. If the patient can sign, make every effort to find a translator 14. Blind patients – The paramedic should be careful to announce him or herself and to explain who he or she is and why he or she is there 15. Talking with family and friends a. Some patients may not be able to provide you with all information b. Try to find a third party who can help provide the whole story
9.3.6 – Integration of Therapeutic Communication, History Taking Techniques, Patient Presentation, and Assessment Findings (Development of Field Impression)	
C 9.3.6.1 – Discuss the fundamental elements of critical thinking for paramedics to develop a field impression of the patient given the integration of therapeutic communication, history taking techniques, patient presentation, and assessment findings.	N/A
9.3.7 – Treatment Plan (Modify Initial Treatment Plan)	
C 9.3.7.1 – Summarize the "six Rs" of putting it all together to develop and implement a treatment plan based upon the field impression.	1. Read the patient 2. Read the scene 3. React 4. Reevaluation 5. Revise the management plan 6. Review performance
9.3.8 – Age-Related Considerations	
C 9.3.8.1 – Discuss considerations when obtaining a history for a pediatric patient.	1. History may be taken from parent or responsible adult a. Every effort must be made to include the child b. Explore the underlying fears that may not be expressed by the parents or child c. Evaluate the relationship of the child to the caregiver 2. Present problem or illness 3. Past medical history a. General health evaluation varies dependent on the child's age i. Neonates and infants 1. Maternal health during pregnancy a. Specific maternal b. Medications, hormones, vitamins c. Drug use

	2. Birth a. Duration of pregnancy b. Location of birth c. Labor conditions d. Delivery complications e. Condition of infant at birth f. Birth weight 3. Neonatal period a. Congenital anomalies b. Jaundice, vigor, evidence of illness c. Feeding issues d. Developmental landmarks ii. School-age 1. Grades, performance, problems 2. Dentition 3. Growth 4. Sexual development 5. Illnesses 6. Immunizations iii. Adolescents 1. Consider questioning patient in private 2. Risk-taking behaviors 3. Self-esteem issues 4. Rebelliousness 5. Drug, alcohol use 6. Sexual activity 4. Family history a. Maternal gestational history b. Deceased siblings 5. Personal and social history a. Personal status b. Home conditions 6. Review of systems a. Skin: Lesions b. Ears: Otitis media c. Nose: Snoring, mouth breathing, allergies d. Teeth: Dental history
C 9.3.8.2 – Discuss considerations when obtaining a history for a geriatric patient.	1. Sensory issues (hearing and vision) may require paramedic to interview at eye-level so patient can read lips 2. The interview may need to be slowed down if the patient is stable 3. Multiple underlying chronic illnesses may confound the history 4. Disease symptoms may be less dramatic in the older patient 5. All symptoms may be vague and non-specific 6. Multiple pharmaceutical therapies may lead to: a. Iatrogenic illnesses b. Accidental overdose or adverse drug interaction 7. Consider inclusion of a functional assessment during the systems review in the elderly patient with apparent disability a. Mobility b. Upper extremity function

	c. Instrumental activities of daily living ("IADL") d. Activities of daily living

9.4 – Secondary Assessment

Objective	Educational Standard
9.4.1 – Techniques of Physical Examination	
C 9.4.1.1 – List major body systems.	N/A
C 9.4.1.2 – List major anatomical regions.	N/A
9.4.2 – Physical Examination Techniques Will Vary from Patient to Patient Depending on the Chief Complaint, Present Illness, and History	
C 9.4.2.1 – Discuss the need to employ different physical examination techniques given differences in patients and their chief complaints, present illnesses, and histories.	1. The appropriate assessment of the patient depends on: a. The stability of the patient b. The complaint c. The history d. Ability to communicate e. The potential for unrecognized illness 2. Not all aspects of the physical assessment that the provider should be familiar with will be used on all patients.
9.4.3 – Physical Examination (Approach and Overview)	
C 9.4.3.1 – Define various physical examination techniques.	1. Examination techniques a. Inspection b. Palpation i. Hand and finger techniques 1. Fingertip 2. Palmar hand surface 3. Ulnar hand surface 4. Dorsal hand surface ii. Light iii. Deep c. Percussion i. Technique ii. Percussion notes d. Auscultation i. Locations ii. Findings 2. Measurement of vital signs a. Respirations b. Pulse c. Blood pressure d. Pupils e. Pulse oximetry f. Temperature g. Pain level 3. Height and weight estimation
C 9.4.3.2 – Discuss the general approach to be taken in conducting a physical examination of a patient.	1. Examine the patient systematically 2. Examine the patient in the most appropriate environment available

	a. Consider issues of privacy, comfort b. Most appropriate position for best assessment techniques 3. Place special emphasis on areas suggested by the present illness and chief complaint 4. Keep in mind that most patients view a physical exam with apprehension and anxiety; they feel vulnerable and exposed 5. Maintain professionalism throughout the physical exam while displaying compassion toward the patient
C 9.4.3.3 – List the categories of a comprehensive physical examination.	1. Mental status 2. General survey 3. Vital signs
9.4.4 – Mental Status	
C 9.4.4.1 – Describe the examination of a patient's mental status.	1. Appearance and behavior a. Assess for level of consciousness i. Alertness ii. Response to verbal stimuli iii. Response to touch or shake of shoulder (tactile) iv. Response to painful stimuli v. Unresponsive b. Measurement tools for assessment of mental status c. Observe posture and motor behavior i. Pace ii. Range iii. Character iv. Appropriateness of movement v. Possible findings 1. Normal 2. Abnormal a. Restlessness b. Agitation c. Bizarre postures d. Immobility e. Involuntary movements d. Dress, grooming, and personal hygiene i. Kempt ii. Unkempt e. Facial expression i. Anxiety ii. Depression iii. Elation iv. Anger v. Fear vi. Withdrawn vii. Sadness viii. Pain f. Manner, affect, and relation to person and things 2. Speech and language – Assess a. Quantity b. Rate c. Loudness d. Fluency e. Appropriateness

f. Possible findings
    i. Aphasia
    ii. Dysphonia
    iii. Dysarthria
    iv. Changes with mood disorders
3. Mood – Assess
    a. Nature
    b. Intensity
    c. Duration
    d. Stability of abnormal mood
    e. Suicidal ideation
    f. Possible findings
4. Thought and perceptions
    a. Assess thought processes
        i. Logic
        ii. Relevance
        iii. Organization
        iv. Coherence of thought
        v. Possible findings
            1. Loosening of associations
            2. Flight of ideas
            3. Incoherence
            4. Confabulation
            5. Blocking
            6. Transference
    b. Assess thought content
        i. Unusual thoughts
        ii. Unpleasant thoughts
        iii. Possible findings
            1. Suicidal ideation
            2. Homicidal
            3. Obsessions
            4. Compulsions
            5. Delusions
            6. Feelings of unreality
    c. Assess perceptions
        i. Unusual
        ii. Hearing things
        iii. Seeing things
        iv. Possible findings
            1. Illusions
            2. Hallucinations
5. Assess insight and judgment
    a. Insight into illness
    b. Level of judgment in making decisions or plans
    c. Possible findings
        i. Recognition or denial of mental cause of symptoms
        ii. Bizarre, impulsive, or unrealistic judgment
6. Memory or attention
    a. Assess orientation
        i. Time
        ii. Person
        iii. Place
        iv. Disorientation

	b. Assess attention i. Digit span ii. Serial sevens iii. Spelling backward c. Assess remote memory (i.e., birthdays) d. Assess recent memory (i.e., events of the day) e. Assess new learning ability (recall the paramedic's name)
9.4.5 – Techniques of Physical Exam: General Survey	
C 9.4.5.1 – Discuss the techniques used in conducting a general survey physical examination.	1. Introduction a. Wide range of "normal" b. Repetitive examination of multiple patients needed to establish one's own baseline knowledge 2. Physical findings in relation to development a. Age b. Sexual development c. Weight d. Height 3. Body structure a. Symmetry b. Body build c. Physical fitness d. Posture 4. Level of consciousness a. AVPU b. Level of orientation 5. Skin signs a. Color b. Temperature c. Condition d. Texture e. Hydration 6. Age variation a. Pediatric variation b. Geriatric variation
9.4.6 – Vital Signs	
C 9.4.6.1 – Identify vital signs commonly obtained during a physical examination.	1. Introduction a. Vital signs as baseline measurement of function i. Respiration ii. Circulation iii. Perfusion b. Position patient in normal position for accurate readings 2. Respiration a. Respiratory rate i. Visualize ii. Expose as necessary b. Respiratory depth c. Respiratory effort 3. Circulation a. Pulse rate b. Pulse rhythm i. Predictable

	ii. Adjust timing for irregularity c. Pulse strength d. Pulse location i. Common locations ii. Relation to perfusion 4. Perfusion a. Blood pressure i. Equipment size ii. Placement of cuff iii. Position of patient iv. Position of arm b. Methods of measurement i. Auscultation ii. Palpation c. Oxygen saturation d. Capnography e. Capillary refill f. Oral mucosal color
9.4.7 – Examination by Anatomical Region or System	
C 9.4.7.1 – Discuss the examination of the body by region/system to include normal findings, abnormal findings, and the significance of any abnormal findings.	1. Skin, hair, and nails a. Review of anatomy and physiology b. Review of relate history c. Relevant past medical history d. Relevant family history e. Relevant personal and social history f. Age-related pertinent history and findings i. Examination and findings 1. Skin 2. Common lesions 3. Characteristics 4. Exudates 5. Patterns 6. Correlation to disease processes ii. Hair 1. Inspection 2. Palpation iii. Nails 1. Inspection 2. Common nail changes 3. Correlation to disease processes g. Infants and children i. Normal changes related to birth ii. Related to underlying systemic conditions h. Adolescents i. Pregnancy i. Pigmentation changes ii. Striae gravidarum j. Geriatrics i. Changes associated with aging ii. Changes due to immobility k. Common abnormalities 2. Lymphatic system a. Review of anatomy and physiology

b. Review of related history
   i. Relevant past medical history
   ii. Relevant family history
   iii. Age-related pertinent history and findings
c. Examination and findings
   i. Inspection and palpation of lymph nodes
   ii. Head and neck
   iii. Axillae
   iv. Other lymph nodes
d. Associate findings
e. Infants and children
f. Common abnormalities
g. Documentation terminology

3. Head and neck
   a. Review of anatomy and physiology
   b. Review of related history
      i. Present problem
      ii. Past medical history
      iii. Personal and social history
      iv. Family history
   c. Examination findings
      i. Head and face
         1. Inspection
         2. Palpation
      ii. Neck
         1. Inspection
         2. Palpation
   d. Infants and children
      i. Findings related to birth and development
      ii. Head control
      iii. Symmetry
   e. Common abnormalities
      i. Adults
      ii. Infants
   f. Documentation terminology
4. Eyes
   a. Review of anatomy and physiology
   b. Review of related history
      i. Present problem
      ii. Past medical history
      iii. Personal and social history
      iv. Family history
   c. Examination and findings
      i. Visual acuity
      ii. External examination
      iii. Extraocular muscles
      iv. Opthalmoscopic examination
   d. Common abnormalities
   e. Infants and children
      i. Ethnic variation
      ii. Newborn variations
      iii. Congenital changes
5. Ear, nose, throat, and neck
   a. Review of anatomy and physiology
   b. Review of related history

i. Present problem
ii. Past medical history
iii. Family history
c. Examination and findings
i. Ear
1. External ear
2. Otoscopic examination
3. Tympanic membrane finding
4. Hearing
ii. Nose
1. External nose
2. Nasal cavity
3. Lips
4. Buccal mucosa, teeth, and gums
5. Tongue
6. Oropharynx
iii. Sinuses
iv. Infants and children
d. Documentation terminology
6. Chest and lungs
a. Review of anatomy and physiology
b. Review of related history
i. Present problem
ii. Past medical history
iii. Family history
iv. Personal and social history
c. Examination and findings
i. Inspection of chest
ii. Evaluation of respiration
1. Terminology
2. Patterns of respiration
3. Signs of obstruction
iii. Palpation
1. Deformity
2. Crepitation
3. Tactile fremitus
4. Chest expansion
iv. Percussion
1. Percussion techniques
2. Percussion tones
v. Auscultation
1. Characteristics of normal breath sounds
2. Adventitious breath sounds
a. Dry versus moist
b. Continuous versus intermittent
c. Course versus fine
3. Crackles
4. Ronchi
5. Wheezes
6. Other sounds
vi. Vocal resonance
1. Bronchophony
2. Egophony
3. Whispered pectoriloquy
vii. Common causes of adventitious sounds and noisy

breathing
viii. Variations of age in children, infants, and older patients
ix. Common abnormalities found in chest examination
x. Findings related to common disease processes
xi. Documentation terminology

7. Heart and blood vessels
   a. Review of anatomy and physiology
   b. Review of related history
      i. Present problem
      ii. Past medical history
      iii. Personal and social history
      iv. Family history
      v. Risk factors
   c. Examination and findings
      i. Heart
         1. Inspection
         2. Palpation
            a. Apical pulse
            b. Thrills
            c. Heaves
            d. Carotid pulse
         3. Percussion
         4. Auscultation
            a. Basic heart sounds
            b. Splitting
               i. Identification
               ii. Significance
            c. Extra heart sounds
               i. Identification
               ii. Significance
            d. Murmurs
               i. Identification
               ii. Significance
               iii. High output states
      ii. Peripheral arteries
         1. Location of palpable arteries
         2. Pulse characteristics
         3. Significance of findings
         4. Amplitude scale
         5. Auscultation
            a. Indication
            b. Findings
         6. Assessment of occlusion
      iii. Hypertension classification
      iv. Peripheral veins
         1. Jugular venous pressure
            a. Findings
            b. Significance
         2. Venous obstruction
      v. Thrombosis
      vi. Edema
      vii. Newborn and infant
         1. Cardiovascular findings associated with birth

2. Assessment for insufficiency
viii. The older patient
d. Common abnormalities of the heart and blood vessels
e. Documentation terminology

8. Abdomen
a. Review of anatomy and physiology
b. Review of related history
i. Present problem
ii. Past medical history
iii. Personal and social history
iv. Family history
v. Risk factors
c. Examination and findings
i. Preparation
1. Patient positioning
2. Landmarks
ii. Inspection
1. Skin
a. Lesions
b. Venous patterns
c. Scars
2. Symmetry
3. Shape
4. Size
5. Herniation
6. Distention
7. Movement
iii. Auscultation
1. Bowel sounds
2. Bruits
iv. Percussion
1. Percussion tones
2. Liver span
3. Other organs
4. Gastic bubble
v. Palpation
1. Technique
2. Expected findings
3. Identification of masses
4. Liver palpation techniques
5. Gallbladder
6. Spleen
7. Kidney
vi. Common abnormalities
vii. Findings related to common disease processes
viii. Common conditions causing abdominal pain
ix. Findings in peritonitis
d. Infants and children
i. Umbilical cord
ii. Abdominal herniation
iii. Auscultation and percussion
iv. Palpation
e. Older patient
f. Documentation terminology

9. Genitalia

a. Female – See Special Populations, Obstetrical and Medical Emergencies, and Gynecological
b. Male
    i. Review of anatomy and physiology
    ii. Review of related history
        1. Present problem
        2. Past medical history
        3. Personal and social history
    iii. Examination and findings
        1. Inspection and palpation
        2. Lesions
        3. Priapism
        4. Hernia
    iv. Common abnormalities
    v. Documentation terminology

10. Anus, rectum
    a. Review of anatomy and physiology
    b. Review of related history
        i. Present problem
        ii. Past medical history
        iii. Personal and social history
        iv. Family history
    c. Examination and findings
    d. Common abnormalities
    e. Documentation terminology
11. Musculoskeletal system
    a. Review of anatomy and physiology
    b. Review of related history
        i. Past problem
        ii. Past medical history
        iii. Personal and social history
    c. Examination and findings
        i. Inspection
        ii. Palpation
        iii. Range of motion
        iv. Muscle strength
        v. Specific joint assessment
    d. Specific landmarks in child development
    e. Older patients
        i. Mobility changes
        ii. Joint and muscle changes
        iii. Muscle mass reduction
    f. Common abnormalities
12. Neurological system
    a. Review of anatomy and physiology
    b. Review of related history
        i. Present problem
        ii. Past medical history
        iii. Personal and social history
    c. Examination and findings
        i. Cognitive abilities
        ii. Cranial nerve assessment
        iii. Proprioception and cerebellar function
            1. Coordination and fine motor skills
            2. Balance

	iv. Sensory function 1. Primal 2. Cortical v. Reflexes d. Examination of the non-responsive patient i. Posturing ii. Painful stimulus response e. Infants and children i. Newborn reflexes ii. Activity levels f. Older patients – Changes associated with aging g. Common abnormalities
P 9.4.7.2 – Demonstrate an appropriate secondary assessment/survey of a patient.	N/A
9.4.8 – Modifying the Assessment for the Patient with a Life-Threatening Emergency	
C 9.4.8.1 – Discuss how the assessment process is modified when a patient has a life-threatening emergency.	1. Head-to-toe approach 2. Primary before secondary a. Secondary medical assessment order b. Secondary trauma assessment order (see Trauma)

9.5 – Monitoring Devices

Objective	Educational Standard
9.5.1 – Continuous ECG Monitoring	
C 9.5.1.1 – Discuss the purpose, indications, procedures, and limitations of continuous ECG monitoring.	1. Purpose 2. Indications a. Patient's presenting with cardiac-related signs and symptoms or potential signs and symptoms of illness with cardiac impact b. Used as advanced monitoring in pre-hospital care 3. Procedures 4. Limitations 5. Interpretation (see Medical Emergency: Cardiology)
9.5.2 – 12-Lead ECG Interpretation	
C 9.5.2.1 – Discuss the purpose, indications, and procedures of 12-lead ECG interpretation.	1. Purpose a. Shorten door to treatment time b. May assist in field care of patient with pharmacological intervention 2. Indications 3. Procedures 4. Interpretation (see Medical Emergency: Cardiology)
9.5.3 – Carbon Dioxide Monitoring	
C 9.5.3.1 – Discuss the purpose, indications, procedures, and limitations of carbon dioxide monitoring.	1. Capnometry (colorimetric) a. Purpose b. Indications c. Procedures d. Limitations i. Essentially a "yes/no" confirmation of device placement ii. Rapidly becomes inactivated with use, therefore must be periodically replaced for continuous monitoring 2. Capnography a. Purpose b. Indications c. Procedures d. Limitations e. Interpretation (see Medical Emergency: Respiratory)
9.5.4 – Basic Blood Chemistry	
C 9.5.4.1 – Discuss the purpose, indications, procedures, and limitations of basic blood chemistry analyses.	1. Blood glucometer a. Purpose b. Indications i. Known diabetic ii. Unconscious patient, for unknown reason iii. General malaise/weakness, for unknown reason c. Procedures d. Limitations i. Appropriateness of use

	ii. Accuracy of reading 2. Cardiac biomarkers a. Purpose b. Indications i. Cardiac patients ii. Patients presenting with signs and symptoms of stroke c. Procedures d. Limitations i. Appropriateness of use ii. Accuracy of reading 3. Other blood analyses a. CHEM-7 b. BNP c. Arterial blood gases ("ABGs")
9.5.5 – Other Monitoring Devices	
C 9.5.5.1 – Discuss other monitoring devices available for use at the paramedic level.	As additional monitoring devices become recognized as the "standard of care" in the out-of-hospital setting, those devices should be incorporated into the primary education of those who will be expected to use them in practice. State regulatory processes may elect to expand, delete, or modify from the monitor devices in this section.

9.6 – Reassessment

Objective	Educational Standard
9.6.1 – How and When to Reassess	
C 9.6.1.1 – Discuss how and when to reassess a patient.	N/A
9.6.2 – Patient Evaluation: Reassessment	
C 9.6.2.1 – Discuss the reassessment process.	1. Chief complaint a. Evaluate severity of chief complaint following treatment b. Monitor associated symptoms 2. Examination 3. Reevaluate prioritization based on information 4. Modify treatment plan as necessary based on reassessment
P 9.6.2.2 – Reevaluate the effectiveness of treatment plan(s) (modify as necessary based upon re-evaluation).	N/A
9.6.3 – Documentation	
C 9.6.2.2 – Discuss the need to document reassessment findings.	N/A
9.6.4 – Age-Related Considerations	
C 9.6.4.1 – Identify age-related considerations for reassessing pediatric and geriatric patients.	1. Pediatrics 2. Geriatrics

10.0 – Medicine

Integrates assessment findings with principles of epidemiology and pathophysiology to formulate a field impression and implement a comprehensive treatment/disposition plan for a patient with a medical complaint.

10.1 – Medical Overview

Objective	Educational Standard
10.1.1 – Assessment Factors	
C 10.1.1.1 – Summarize assessment factors to be considered in developing a comprehensive treatment / disposition plan for a patient with a medical complaint.	1. Scene safety 2. Environment 3. Chief complaint a. Primary reason for EMS response b. Verbal or non-verbal c. Possibly misleading 4. Life threatening conditions 5. Non-life threatening conditions 6. Distracting injuries 7. Tunnel vision 8. Patient cooperation 9. EMT attitude
10.1.2 – Major Components of the Patient Assessment	
C 10.1.2.1 – Identify the major components of a patient assessment.	1. Standard precautions 2. Scene size-up 3. General impression 4. Initial Assessment a. Airway b. Ventilation c. Respiration d. Circulation 5. SAMPLE history a. Importance of a thorough history i. Primary component of the overall assessment of the medical patient ii. Requires a balance of knowledge and skill to obtain a thorough and accurate history iii. Helps to ensure the proper care will be provided for the patient b. Unresponsive patient – May be obtained from evidence at the scene i. Pill containers ii. Medical jewelry iii. Family members iv. Bystanders c. Responsive patient i. Obtained directly from the patient ii. Focused on the patient's chief complaint iii. Additional history may be obtained from

evidence at the scene
1. Pill containers
2. Medical jewelry
3. Family members
4. Bystanders

d. OPQRST mnemonic for evaluation of pain
   i. O – Onset
      1. Focuses on what the patient was doing when the problem began
      2. Question(s): What was the patient doing when the problem began?
   ii. P – Provoke
      1. Focuses on what might provoke the problem for the patient
      2. Question(s): Does anything the patient does make the problem better or worse?
   iii. Q – Quality
      1. Focuses on the patient's own description of the problem
      2. Question(s):
         a. Can the patient describe the pain/discomfort?
         b. What does it feel like?
         c. Is it sharp? Dull?
         d. Is it steady or does it come and go?
   iv. R – Region/Radiate
      1. Focuses on the specific area of the pain/discomfort
      2. Questions(s):
         a. Can the patient point with one finger to the location of the pain/discomfort?
         b. Does the pain/discomfort radiate to any other areas of the body?
   v. S – Severity
      1. Focuses on the severity of the pain/discomfort
      2. Question(s):
         a. On a scale of 0 to 10, with 10 being the worst pain the patient has ever felt, how would the patient rate the pain right now?
         b. How would the patient rate the pain when it first began?
         c. Has there been any change since it first began?
   vi. T – Time
      1. Focuses on the duration of the problem/pain/discomfort
      2. Question(s): When did the problem/pain/discomfort first

begin?

6. Baseline vital signs
7. Secondary assessment
    a. May not be appropriate to perform a complete secondary assessment on all medical patients
    b. Designed to identify any signs or symptoms of illness that may not have been revealed during the initial assessment
        i. Head/scalp
            1. Pain
            2. Shunt
        ii. Face
            1. Pain
            2. Symmetry of facial muscles
        iii. Eyes
            1. Pupil size
            2. Equality and reactivity to light
            3. Pink, moist conjunctiva
        iv. Ears
            1. Pain
            2. Drainage
        v. Nose
            1. Pain
            2. Nasal flaring
        vi. Mouth
            1. Foreign body
            2. Loose dentures
            3. Pink and moist mucosa
        vii. Neck
            1. Pain
            2. Accessory muscle use
            3. Jugular vein distention
            4. Medical jewelry
            5. Stoma
        viii. Chest
            1. Pain
            2. Equal rise and fall
            3. Guarding
            4. Breath sounds
            5. Retractions
            6. Scars
        ix. Abdomen
            1. Pain
            2. Rigidity
            3. Distention
            4. Scars
        x. Pelvis/genital
            1. Pain
            2. Incontinence
        xi. Arms
            1. Pain
            2. Distal circulation
            3. Sensation
            4. Motor function

	5. Track marks 6. Medical jewelry xii. Legs 1. Pain 2. Distal circulation 3. Sensation 4. Motor function 5. Track marks 6. Medical jewelry xiii. Back 1. Pain 2. Scars 8. Continued assessment
10.1.3 – Forming a Field Impression	
C 10.1.3.1 – Discuss the process of forming a field impression based upon assessment findings.	1. Formation of differential diagnosis a. Integration of history and physical assessment findings b. Past experience c. "Gut instinct" 2. Differentiation of the underlying cause of the patient's condition from other possible causes 3. Patient presentation often leads to a recognizable pattern common to multiple conditions with similar presentations 4. Assess for clues to determine minor differences in patient presentation 5. Determine field differential diagnosis based on available information 6. Realize the differential diagnosis may change as the patient condition changes or additional information becomes available

10.2 – Neurology

Objective	Educational Standard
10.2.1 – Introduction (Overview of Neurological Conditions)	
C 10.2.1.1 – Discuss the morbidity/mortality, preventative strategies, and pathophysiology of neurological conditions.	1. Epidemiology 2. Pathophysiology
10.2.2 – Central Nervous System	
C 10.2.2.1 – Discuss the anatomy and physiology of the nervous system.	1. Brain 2. Spinal cord 3. Autonomic and peripheral nervous system
10.2.3 – Neurological Assessment (Normal and Abnormal Findings)	
C 10.2.3.1 – Discuss potential normal and abnormal findings from a neurological assessment of a patient.	1. General appearance 2. Speech 3. Skin 4. Posture/gait 5. Mental status 6. Mood, thought, perception, judgment, memory, and attention 7. Cranial nerve assessment 8. Glascow coma scale
10.2.4 – General Management Considerations	
C 10.2.4.1 – Discuss general management conditions for patients with a neurological emergency.	1. Airway, ventilation, respiration, and circulation 2. Emotional support 3. Transport decisions
10.2.5 – Neurological Conditions	
C 10.2.5.1 – Discuss the epidemiology, pathophysiology, potential assessment findings, and management of commonly encountered neurological emergencies.	1. Altered mental status a. AEIOUTIPS b. Assessment findings and symptoms for AMS c. Pharmacological and nonpharmacological management 2. Stroke, intracranial hemorrhage, and transient ischemic attack ("TIA") a. Incidence, mortality, morbidity, and complications b. Types i. Occlusive stroke 1. Embolic 2. Thrombotic ii. Hemorrhagic c. Transient ischemic attack d. Assessment findings and symptoms i. Stroke assessment scales/scores ii. Stroke alerts/protocols e. Pharmacologic and non-pharmacologic management – Consistent with current ILCOR consensus statement 3. Seizures a. Incidence, mortality, morbidity, and

complications
b. Types
i. Generalized
1. Tonic-clonic
2. Absence
3. Pseudo seizures
ii. Partial
1. Simple partial
2. Complex partial
iii. Status epilepticus
c. Assessment findings and symptoms
d. Pharmacologic and non-pharmacologic management
4. Headache
a. Types
i. Tension
ii. Sinus
iii. Migraine
iv. Cluster
v. Headache as symptom
b. Assessment findings and symptoms
c. Pharmacologic and non-pharmacologic management
5. Dementia
a. Alzheimer's
b. Pick's disease
c. Huntington's disease
d. Crutzfeldt-Jakob disease
e. Wernicke's encephalopathy
f. Assessment findings and symptoms
g. Pharmacologic and non-pharmacologic management
6. Central nervous system neoplasm
a. Brain tumors
b. Spinal tumors
c. Incidence, mortality, morbidity, and complications
d. Assessment findings and symptoms
e. Pharmacologic and non-pharmacologic management
7. Demyelinating neurological disorders
a. Multiple Sclerosis
b. Guillain-Barré Syndrome
8. Parkinson's Disease
a. Incidence, mortality, morbidity, and complications
b. Assessment findings and symptoms
c. Pharmacological and non-pharmacological management
9. Cranial nerve disorders
a. Trigeminal neuralgia
b. Hemifacial spasm
c. Acoustic neuroma
d. Glossopharyngeal neuralgia
e. Vertigo

	f. Ménière's disease g. Disorders of the facial nerve h. Assessment findings and symptoms i. Prehospital implications 10. Movement disorders (dystonia) a. Assessment findings and symptoms b. Pharmacologic and non-pharmacologic management 11. Neurological infections/inflammation a. Encephalitis b. Meningitis c. Assessment findings and symptoms d. Pharmacologic and non-pharmacologic management 12. Spinal cord compression 13. Hydrocephalus 14. Wernicke's encephalopathy
10.2.6 – Age-Related Variations	
C 10.2.6.1 – Identify differences in neurological emergencies affecting pediatric and geriatric patients.	1. Pediatrics a. Epidemiology b. Anatomic and physiologic differences in children c. Pathophysiology d. Causes of altered mental status in children e. Assessment i. History ii. Physical findings f. Meningitis g. Febrile seizures h. Altered mental status i. Ventricular shunts i. Infection ii. Malfunction iii. Hydrocephalus j. Management 2. Geriatrics – Stroke risk high in this age group
10.2.7 – Communication and Documentation	
C 10.2.7.1 – Discuss communication and documentation considerations for patients with neurological emergencies.	N/A
10.2.8 – Transport Decisions	
C 10.2.8.1 – Discuss transport considerations for patients with neurological emergencies.	N/A
10.2.9 – Patient Education and Prevention of Complications or Future Neurological Emergencies	
C 10.2.9.1 – Discuss patient education and prevention of complications or future neurological emergencies.	N/A

10.3 – Abdominal and Gastrointestinal Disorders

Objective	Educational Standard
10.3.1 – Introduction	
C 10.3.1.1 - Discuss the morbidity/mortality, risk factors, and preventative strategies associated with abdominal and gastrointestinal disorders.	1. Incidence 2. Mortality/morbidity 3. Risk factors 4. Prevention strategies
10.3.2 – General Pathophysiology, Assessment, and Management	
C 10.3.2.1 – Discuss the pathophysiology of abdominal pain.	1. Bacterial contamination 2. Chemical irritation 3. Types of abdominal pain a. Somatic pain b. Visceral pain c. Referred pain
C 10.3.2.2 – Discuss assessment findings as related to the patient with an abdominal or gastrointestinal emergency.	1. Focused history a. Onset b. Provoking factors c. Quality d. Region/radiation e. Severity f. Time g. Previous history of same event h. Nausea/vomiting i. Change in bowel habits/stool i. Constipation ii. Diarrhea j. Weight loss k. Last meal l. Chest pain m. Signs or symptoms of shock n. ECG abnormalities 2. Focused physical examination a. Appearance, posture b. Level of consciousness c. Apparent state of health, skin color d. Inspect abdomen e. Auscultate abdomen f. Percuss abdomen g. Palpate abdomen 3. Assessment tools
C 10.3.2.3 – Discuss the management and treatment of patients with an abdominal or gastrointestinal emergency.	1. Airway and ventilator support a. Maintain an open airway b. High-concentration oxygen 2. Circulatory support a. IV fluid administration based on assessment for fluid loss b. Medication administration 3. Pharmacologic interventions for pain management 4. Non-pharmacologic interventions a. Nothing by mouth

	b. Monitor level of consciousness c. Monitor vital signs d. Position of comfort e. Nasogastric tube if indicated 5. Transport consideration (gentle, but rapid transport) 6. Psychological support
10.3.3 – Specific Injuries/Illness: Causes, Assessment Findings, and Management for Each Condition	
C 10.3.3.1 – Discuss the pathophysiology, potential assessment findings, and management of commonly encountered abdominal and gastrointestinal emergencies.	1. Upper gastrointestinal bleeding a. Ulcerative diseases i. Peptic ulcer disease ii. Pathophysiology iii. Patient history iv. Erosive gastritis b. Esophagogastric varices c. Other causes 2. Lower gastrointestinal bleeding – Common causes a. Non-life threatening i. Hemorrhoids 1. Presentation 2. Prehospital implications ii. Anal fissures iii. Other b. Potentially life-threatening i. Diverticulitis ii. Other 3. Liver diseases a. Hepatitis (see Infectious Disease) b. Cirrhosis i. Pathophysiology ii. Signs and symptoms iii. Prehospital implications c. Hepatic encephalopathy i. Pathophysiology ii. Signs and symptoms iii. Prehospital implications 4. Infectious Disorders a. Pathophysiology b. Signs and symptoms i. Fever ii. Ascites iii. Abdominal pain characteristics iv. Hemodynamic instability v. Pharmacologic and non-pharmacologic interventions c. Peritonitis d. Gastroenteritis i. Causative organisms 1. Rotavirus, Norwalk virus, and many others 2. Parasites

a. Protozoa giardia lamblia
b. Crypto sporidium parvum
c. Cyclosporidium cayetensis
3. Contracted via fecal-oral transmission, contaminated food, and water

ii. Bacteria
1. Escherichia coli
2. Klebsiella pneumonia
3. Enterobacter
4. Campylobacter jejuni
5. Vibrio cholera
6. Shigella
7. Salmonella

iii. Prehospital management

5. Ulcerative disorders
6. Irritable bowel syndrome
a. Pathophysiology
b. Signs and symptoms
c. Prehospital implications
7. Inflammatory bowel disease
a. Ulcerative colitis – Pathophysiology
b. Crohn's disease
i. Pathophysiology
ii. Signs and symptoms
iii. Prehospital treatment
c. Cholecystitis and biliary tract disorders
i. Pathophysiology
ii. Signs and symptoms
iii. Prehospital implications
d. Pancreatitis
i. Pathophysiology
ii. Signs and symptoms
iii. Pharmacologic and non-pharmacologic
e. Appendicitis
i. Pathophysiology
ii. Signs and symptoms
iii. Prehospital implications
iv. Prehospital management
f. Diverticulitis
i. Pathophysiology
ii. Signs and symptoms
iii. Prehospital management
8. Bowel obstruction
a. Definition
b. Small bowel obstruction
i. Causes
1. Adhesions
2. Cancer
3. Crohn's disease
4. Others

ii. Pathophysiology
iii. Morbidity and mortality
iv. Signs and symptoms
v. Prehospital management

	c. Large bowel obstruction i. Causes 1. Cancer 2. Diverticulitis 3. Volvulus ii. Pathophysiology iii. Morbidity and mortality iv. Signs and symptoms v. Prehospital management 9. Hernias a. Definition b. Causes c. Locations d. Signs and symptoms e. Incarcerated hernia i. Signs and symptoms ii. Prehospital management 10. Rectal foreign body obstruction a. Pass from upper GI tract i. Gall stones ii. Fecaliths iii. Swallowed foreign objects b. Introduced from anus c. Signs and symptoms i. Pain ii. Signs of infection d. Management i. Pain management ii. Transport for evaluation and removal 11. Rectal abscess 12. Mesenteric ischemia
10.3.4 – Consider Age-Related Variations	
C 10.3.4.1 - Identify differences in abdominal and gastrointestinal emergencies affecting pediatric and geriatric patients.	1. Pediatrics a. Epidemiology b. Anatomic and physiologic differences in children c. Pathophysiology i. Embryology of the GI tract ii. Vomiting mechanism iii. Electrolyte complications of gastroenteritis and pyloric stenosis iv. GI bleeding d. Assessment i. History ii. Physical findings e. Vomiting i. Gastroenteritis ii. Malrotation iii. Pyloric stenosis f. Lower GI Bleeding g. Gastrostomy tube dysfunction h. Neonatal jaundice i. Management 2. Geriatrics

		a. AAA more common b. May not exhibit rigidity or guarding c. Abdominal pain related to cardiac conditions
10.3.5 – Communication and Documentation		
C 10.3.5.1 - Discuss communication and documentation considerations for patients with abdominal and gastrointestinal emergencies.	N/A	
10.3.6 – Transport Decisions		
C 10.3.6.1 - Discuss transport considerations for patients with abdominal and gastrointestinal emergencies.	N/A	
10.3.7 – Patient Education and Prevention		
C 10.3.7.1 - Discuss patient education and prevention of complications or future abdominal or gastrointestinal emergencies	N/A	

10.4 – Immunology

Objective	Educational Standard
10.4.1 – Introduction	
C 10.4.1.1 - Discuss the morbidity/mortality, preventative strategies, and pathophysiology of immunology conditions.	1. Incidence, morbidity, and mortality of common or major immune system disorders 2. Collagen vascular disease 3. Allergic reaction and anaphylaxis 4. Hypersensitivity 5. Transplant disorders
10.4.2 – Pathophysiology	
C 10.4.2.1 – Discuss the pathophysiology of immunology emergencies.	1. Immunity a. Natural b. Acquired 2. Immune response a. Humoral b. Cell-mediated 3. Allergic reaction a. Antigens b. Antibodies c. Mast cells and basophils d. Histamine, leukotrienes, and other mediators e. Local reactions f. Systemic reactions
10.4.3 – Assessment	
C 10.4.3.1 – Discuss the assessment of a patient suffering from an allergic reaction.	1. Mild allergic reaction a. Cutaneous b. Other 2. Moderate allergic reaction a. Upper airway b. Lower airway c. Cardiovascular d. Cutaneous e. Gastrointestinal f. Neurological 3. Severe allergic reaction/anaphylaxis a. Upper airway b. Lower airway c. Cardiovascular d. Cutaneous e. Gastrointestinal f. Neurological
10.4.4 – Anaphylactoid Reaction	
C 10.4.4.1 – Describe the anaphylactoid reaction process.	N/A
10.4.5 – Managing an Allergic Reaction	
C 10.4.5.1 – Discuss the management of a patient suffering from an allergic reaction.	1. Provide treatment specific to assessment findings and severity of reaction. 2. Remove allergen if possible 3. Protect the airway (consider intubation) 4. Ventilate if needed 5. IV access a. Fluid administration

	b. Medication administration 6. Pharmacologic interventions a. Oxygen b. Epinephrine c. Antihistamines d. Corticosteroids e. Vasopressors f. Beta agonists g. Magnesium sulfate h. Bronchodilators
10.4.6 – Collagen Vascular Disease	
C 10.4.6.1 – Discuss collagen vascular disease.	1. Systemic lupus erythmatosis a. Effects on the body i. Cutaneous effects ii. Musculoskeletal iii. Pleural iv. Pericardial v. Neurologic vi. Hematologic b. Prehospital implications 2. Scleroderma a. Effects on the body i. Renal ii. Cardiovascular b. Prehospital implications
10.4.7 – Transplant-Related Problems	
C 10.4.7.1 – Discuss transplant-related problems.	1. Types of solid organ transplant 2. Assessment considerations 3. Common complications related to immunosuppression a. Infection b. Rejection c. Drug toxicity i. Cyclosporine 1. Interacts with many other drugs 2. Renal toxicity ii. Azathioprine 1. Neutropenia 2. Hepatic and gastrointestinal effects iii. Corticosteroids
10.4.8 – Consider Age-Related Variations in Pediatric and Geriatric Patients	
C 10.4.8.1 - Identify differences in immunology emergencies affecting pediatric and geriatric patients.	N/A
10.4.9 – Communication and Documentation	
C 10.4.9.1 - Discuss communication and documentation considerations for patients with immunology emergencies.	N/A
10.4.10 – Transport Decisions	
C 10.4.10.1 - Discuss transport considerations	N/A

for patients with immunology emergencies.	
10.4.11 – Patient Education and Prevention	
C 10.4.11.1 - Discuss patient education and prevention of complications or future immunology emergencies.	N/A

10.5 – Infectious Diseases

Objective	Educational Standard
10.5.1 – Public Health Principles and Agencies Responsible for Public Health	
C 10.5.1.1 – Discuss public health principles relevant to infectious/communicable diseases.	1. Demographic 2. Epidemiology diseases a. Endemic b. Epidemic c. Pandemic
C 10.5.1.2 – Identify public health agencies involved in the prevention and management of disease outbreaks.	N/A
10.5.2 – Pathophysiology of Infectious Disease	
C 10.5.2.1 – Discuss the pathophysiology of infectious disease.	1. Infectious agents a. Bacteria b. Viruses c. Fungi d. Protozoa e. Helminths (worms) 2. Factors that affect agent's ability to cause disease 3. Chain of infection a. Infectious agent b. Reservoir c. Portal of entry d. Mode of transmission i. Direct contact ii. Droplet iii. Vector e. Portal of exit f. Factors that affect susceptibility 4. Body's response – Barriers a. External i. Flora ii. Skin iii. Gastrointestinal system iv. Respiratory system v. Genitourinary system b. Internal i. Inflammatory response ii. Immune response iii. Limited to specific infectious agent 5. Stages of infectious disease a. Latent b. Incubation period c. Communicability period d. Disease period
10.5.3 – Standard Precautions, Personal Protective Equipment, and Cleaning and Disposing of Equipment and Supplies	
C 10.5.3.1 – Discuss techniques employed by paramedics to limit or prevent the spread of	1. Principles of standard precautions 2. Current hand washing guidelines

infectious diseases.	3. Current recommendations for standard precautions 4. Current recommendations for cleaning or sterilization of equipment 5. Current recommendations for disposing of contaminated linens and supplies, including sharps
P 10.5.3.2 – Demonstrate use of personal protective equipment.	
P 10.5.3.3 – Protect self and others from bloodborne pathogens and infectious disease.	N/A
10.5.4 – Specific Diseases and Conditions	
C 10.5.4.1 - Discuss the pathophysiology, potential assessment findings, and management of commonly encountered infectious disease emergencies	1. HIV and AIDS a. Incidence, morbidity, mortality, risk factors, and modes of transmission b. Pathophysiology c. Body systems affected d. Progression of disease, including opportunistic infections e. Healthcare worker susceptibility and transmission f. Assessment findings and symptoms i. Often asymptomatic ii. Non-specific febrile illness iii. Sore throat, fatigue iv. Swollen spleen and lymph glands v. Weight loss vi. Opportunistic infections g. Management for a patient with HIV or AIDS-related conditions i. Prehospital care is supportive ii. Manage airway and support ventilation iii. IV if needed iv. Respiratory isolation if coughing h. Immunization and treatment of exposure 2. Hepatitis a. Pathophysiology, incidence, types, causes, risk factors, methods of transmission, and complications b. General assessment findings and symptoms i. Asymptomatic ii. Non-specific febrile illness iii. Light-colored stools iv. Dark urine v. Fatigue vi. Nausea/vomiting vii. Abdominal pain/tenderness viii. Jaundice ix. Fulminant acute hepatitis c. Treatments for exposure/prevention; immunizations d. Types i. Hepatitis A ii. Hepatitis B

iii. Hepatitis C
iv. Hepatitis D
v. Hepatitis E
vi. Hepatitis G
vii. Other

e. Management for a patient with hepatitis
i. Prehospital care is supportive
ii. Manage airway and support ventilation
iii. IV if needed

3. Pneumonia
a. Pathophysiology, incidence, risk factors, methods of transmission, and complications
b. Etiologic agents/causative organisms
i. Bacterial
ii. Viral
iii. Fungal
c. General assessment findings and symptoms
i. Chills, high-grade fevers, chest pain with respirations, tachypnea, and dyspnea
ii. Signs of respiratory distress
iii. Productive cough (yellow or green)
iv. Signs of dehydration
v. Breath sounds
1. Diminished breath sounds
2. Localized adventitious sounds
a. Crackles
b. Wheezes
vi. Percussion
d. General management for a patient with pneumonia
i. Airway and ventilatory support
ii. Administer oxygen
iii. Initiate intravenous therapy
iv. Consider pharmacologic interventions related to presenting signs and symptoms
v. Treatments for exposure; immunizations

4. Meningitis
a. Types
i. Meningococcal meningitis
1. Neisseria meningitides
2. Onset rapid, high mortality rate
3. Petechial rash
ii. Streptococcus pneumonia (bacteria)
iii. Hemophilus influenza type B (bacteria)
iv. Viruses (causes syndromes aseptic meningitis)
b. Meningococcal meningitis
i. Pathophysiology, incidence, types, causes, risk factors, methods of transmission, and complications
ii. General assessment findings and symptoms
1. Altered mental status
2. Fever, chills

3. Photophobia
4. Joint pain
5. Nuchal rigidity
   a. Kernig's sign
   b. Brudzinski's sign
6. Seizures
7. Projectile vomiting
8. Headache
9. Septic shock
10. Rash
11. Disseminated intravascular coagulation

iii. Infants and children
1. Infants – Fever, vomiting, irritability, and lethargy
2. Bulging fontanel
3. Older children – Positive Kernig's and Brudzinski's signs may be found

c. General management for a patient with meningitis
i. Standard precautions
ii. Airway and ventilatory support
iii. Administer oxygen
iv. Initiate IV
v. Pharmacologic management
1. Seizures
2. Shock
vi. Rapid transport
vii. Post-exposure prophylaxis

5. Tuberculosis
a. Pathophysiology, incidence, causes, risk factors, methods of transmission, and complications
b. General assessment findings and symptoms
i. Initially a subclinical infection
ii. Indications of acute illness
1. Cough
2. Fever
3. Night sweats
4. Weight loss
5. Fatigue
6. Hemoptysis

c. Management for a patient with tuberculosis
i. Supportive care
ii. Airway and ventilatory support as needed
iii. High-concentration oxygen
iv. Respiratory barriers
1. Paramedic N-95 or HEPA mask
2. Mask on patient
3. Ensure ventilation in ambulance

d. Post-exposure prophylaxis

6. Tetanus
a. Pathophysiology, incidence, causes, risk factors, methods of transmission, incubation,

and complications
- b. General assessment findings and symptoms
  - i. Muscular tetany
    1. Jaw
    2. Neck muscles
    3. Abdominal rigidity may be the first sign in children
    4. Facial muscles
  - ii. Weakness, myalgias, muscle cramps
  - iii. Dysphagia, hydrophobia, drooling
  - iv. Respiratory failure
- c. General management for a patient with tetanus
  - i. Supportive
  - ii. Airway and support ventilation
  - iii. Administer oxygen
  - iv. Establish intravenous
  - v. Pharmacologic
- d. Post-exposure considerations
- e. Immunization

7. Viral diseases
   - a. Chickenpox
     - i. Pathophysiology, incidence, causes, risk factors, methods of transmission, and complications
     - ii. General assessment findings and symptoms
       1. Respiratory symptoms, malaise, and low-grade fever
       2. Rash (small, red spots, then raised blisters on red)
       3. Fluid-filled vesicles, then dry into scabs
     - iii. Patient management for a patient with chickenpox
       1. Supportive
       2. Isolation
     - iv. Post-exposure considerations
     - v. Vaccines
   - b. Mumps
     - i. Pathophysiology, incidence, causes, risk factors, methods of transmission, and complications
     - ii. General assessment findings and symptoms
       1. Fever
       2. Swelling and tenderness of salivary glands, especially parotid
     - iii. General management for a patient with mumps
       1. Supportive
       2. Isolation
     - iv. Post-exposure considerations
     - v. Immunization
   - c. Rubella

i. Pathophysiology, incidence, causes, risk factors, methods of transmission, and complications
ii. General assessment findings and symptoms
1. Initial – Fever and flu symptoms
2. Secondary – Red maculopapular rash
iii. General management for a patient with rubella
1. Supportive
2. Isolation
iv. Post-exposure considerations
v. Immunization

d. Measles
i. Pathophysiology, incidence, causes, risk factors, methods of transmission, and complications
ii. General assessment findings and symptoms
1. Prodrome – Conjuctivitis, swelling of the eyelids, photophobia, high fevers, hacking cough, and malaise
2. Small, red-base lesions with blue-white centers in the mouth (Koplik's spots)
3. Generalize rash
iii. General management for a patient with measles
1. Supportive
2. Isolation
iv. Post-exposure considerations
v. Immunization

e. Pertussis (whooping cough)
i. Pathophysiology, incidence, causes, risk factors, methods of transmission, and complications
ii. General assessment findings and symptoms
1. Cough paroxysms are violent, sometimes without an intervening inhalation
2. High-pitched whooping sound or crowing
3. Clear mucus, vomiting
iii. General management for a patient with pertussis
1. Supportive
2. Isolation
iv. Post-exposure considerations
v. Immunization

8. Other viral diseases
a. Influenza
i. Pathophysiology, incidence, causes, risk factors, methods of transmission, and

complications
ii. General assessment findings and symptoms
1. Upper respiratory illness-type symptoms
2. Cough is often severe and protracted
3. Fever and body aches
iii. General management for a patient with influenza
1. Patient treatment is supportive
2. IV fluids if dehydrated
iv. Immunization and treatment of exposure

b. Mononucleosis
i. Pathophysiology, incidence, causes, risk factors, methods of transmission, and complications
ii. General assessment findings and symptoms
1. Fever, sore throat, oropharyngeal discharges
2. Lymphadenopathy (especially posterior cervical) and splenomegaly
3. Lack of energy
iii. General management for a patient with mononucleosis
1. Patient treatment is supportive
2. IV fluids if dehydrated
iv. Immunization and treatment of exposure

c. Herpes simplex virus type 1
i. Pathophysiology, incidence, causes, risk factors, methods of transmission, and complications
ii. General assessment findings and symptoms
1. Cold sores and fever blisters, which are generally found on the lips, face, conjunctiva, or oropharynx
2. Newborns may get meningoencephalitis
3. Aseptic meningitis in adults
iii. General management for a patient with herpes simples type 1
1. Supportive care
2. IV fluids if dehydrated
iv. Immunization and treatment of exposure
1. Highly contagious
2. Antiviral medication

d. Hantavirus
i. Pathophysiology, incidence, causes, risk factors, methods of transmission, and complications

ii. General assessment findings and symptoms
1. Onset of illness is non-specific
2. Fever, malaise, aches, and generalized pains
3. Headache, nausea/vomiting, abdominal pain
4. Diarrhea, cough, weakness
5. Respiratory distress, severe dyspnea, dizziness, chest and back pain

iii. General management for a patient with hantavirus

9. Sexually transmitted diseases
   a. Pathophysiology, incidence, causes, risk factors, methods of transmission, and complications for common sexually transmitted diseases
   b. General management for a patient with sexually transmitted diseases
   c. Specific conditions, general assessment findings, and symptoms
      i. Syphilis
      ii. Gonorrhea
      iii. Chlamydia
      iv. Herpes simples virus type 2 (genital herpes)
      v. Scabies and lice
      vi. Lyme disease
10. Gastroenteritis
   a. Pathophysiology, incidence, causes, risk factors, methods of transmission, and complications for gastroenteritis caused by an infectious agent
      i. Rotavirus
      ii. Parasites
      iii. Bacteria
      iv. Other
   b. General assessment findings and symptoms for patients with gastroenteritis caused by an infectious agent
   c. General management for a patient with gastroenteritis caused by an infectious agent
      i. Antiemetic
      ii. IV for fluid replacement
11. Drug resistant bacterial conditions
   a. Pathophysiology, incidence, causes, risk factors, methods of transmission, and complications for a patient with a drug resistant bacterial condition
   b. General assessment findings and symptoms for patients with a drug resistant bacterial condition
   c. General management for a patient with a drug resistant bacterial condition

d. Common conditions
    i. MRSA – Methycillin resistant staphylococcus aureus
    ii. VRSA – Vancomycin resistant staphylococcus aureus
    iii. VRE – Vancomycin resistant enterococcus
    iv. Other

12. Fungal infections
    a. Pathophysiology, incidence, causes, risk factors, methods of transmission, and complications for a patient with a fungal infection
    b. General assessment findings and symptoms for a patient with fungal infections
    c. General management for a patient with fungal infections
13. Rabies
    a. Definition
    b. Epidemiology
    c. Prognosis
        i. Good if treated with early post-exposure prophylaxis
        ii. Fatal when signs and symptoms appear
    d. Transmission
        i. Infected saliva of a host is passed to an uninfected animal
        ii. Bite with virus-containing saliva of an infected host
            1. Raccoons
            2. Skunks
            3. Foxes
            4. Coyotes
            5. Insectivorous bats
        iii. Contamination of mucous membranes (i.e., eyes, nose, mouth), aerosol transmission
        iv. Corneal transplantations
    e. Incubation
    f. Signs and symptoms
        i. Autonomic instability
        ii. Dysphagia
        iii. Hydrophobia
        iv. Paresis
        v. Parethesia
        vi. Progressive worsening of neurologic signs is characteristic of rabies and should be considered as a positive indicator for rabies
    g. Treatment
        i. Clean wound and treat injuries associated with injury first
        ii. Consider potential for infection with all potential exposures
            1. Saliva of infected animals

2. Central neuro system of infected animals
iii. Early exposure prophylaxis
h. Documentation
i. Type of exposure
1. Bite
2. Mucosal
3. Scratch
4. Unknown
ii. Duration of exposure if non-bite

14. Scabies/lice
a. Scabies
i. Definition (infestation of the skin with the microscopic mite sarcoptes scabei)
ii. Epidemiology
1. Prevalence – Infestation is common, found worldwide, and affects people of all races and social classes
2. Spread by skin-to-skin contact between people, such as in hospitals, institutions, child-care facilities, and nursing homes
3. Lifespan of mite
a. 24 to 72 hours away from a host
b. Female can live one month on host
iii. Signs and symptoms
1. Pimple-like irritations
2. Burrows or rash of the skin
3. Intense itching
4. Sores on the body caused by scratching
iv. Onset of signs and symptoms
1. Four to six weeks in patient never having had them before
2. Several days for second exposure
v. Treatment
b. Lice
i. Definition (infestation of the skin under their on people's head, bodies, or pubic areas)
ii. Types
1. Pediculus humanus capitis (head louse)
2. Pediculus humanus corports (body or clothes louse)
3. Pthirus pubis (crab louse or pubic louse)
iii. Epidemiology
iv. Spread by close person-to-person contact
1. Move by crawling, cannot fly or hop
2. Pubic lice spread by sexual contact
v. Lifespan
1. 24 to 48 hours away from a host

	2. 30 days on a host 3. Females lay eight nits per day vi. Signs and symptoms 1. Itching 2. Appearance of nits 3. Appearance of lice vii. Treatment 1. Pediculicides for head lice 2. 1% permethrin or a mousse containing pyrethrins and piperonyl butoxide for pubic lice 15. Lyme disease a. Originally identified in Lyme, CT (now most cases in North and Northeast) b. Caused by the bacteria borrelia burgdorferi, spread by ticks i. Phase I 1. Large, circular lesions 2. Muscle and joint pain 3. Fever, malaise, fatigue 4. Swollen lymph nodes 5. Headache 6. Diffuse erythema 7. Conjuctivitis and periorbital edema ii. Phase II (weeks to months later) 1. Pericarditis 2. Myocarditis 3. AV conduction problems 4. Meningoencephalitis 5. Cranial, peripheral neuropathies iii. Phase III c. Antibiotic treatment during phase I prevents progression 16. Antibiotic resistant infections a. Epidemiology b. Pathophysiology c. Psychosocial impact d. Reporting requirements e. Prognosis f. Assessment g. Management
10.5.5 – Consider Age-Related Variations in Pediatric and Geriatric Patients	
C 10.5.5.1 - Identify differences in infectious disease emergencies affecting pediatric and geriatric patients.	N/A
10.5.6 – Communication and Documentation for a Patient with a Communicable or Infectious Disease	
C 10.5.6.1 - Discuss communication and documentation considerations for patients with infectious disease emergencies.	N/A

10.5.7 – Transport Decisions Including Special Infection Control Procedures	
C 10.5.7.1 - Discuss transport considerations and procedures for patients with infectious disease emergencies.	N/A
10.5.8 – Patient and Family Teaching Regarding Communicable or Infectious Diseases and Their Spread	
C 10.5.8.1 - Discuss patient and family member education and prevention of complications or future infectious disease emergencies.	N/A
10.5.9 – Legal Requirements Regarding Reporting Communicable or Infectious Diseases/Conditions	
C 10.5.9.1 – Discuss the legal requirements for reporting of communicable or infectious diseases or conditions.	1. Exposure of health care provider a. Current recommended treatment modalities and follow-up b. Prevention of exposure or immunizations/vaccines 2. Required reporting to the health department or other health care agency

10.6 – Endocrine Disorders

Objective	Educational Standard
10.6.1 – Overview of Endocrine Conditions	
C 10.6.1.1 – Discuss the anatomy and physiology of the endocrine glands, including the hormones produced within the various glands.	1. Anatomy and physiology (endocrine glands) a. Thyroid b. Hypothalamus c. Pineal d. Thymus e. Pituitary f. Parathyroids g. Adrenals h. Pancreas i. Ovary j. Testis 2. Hormones a. Cortisol b. Aldosterone c. Estrogen d. Progesterone e. Testosterone f. Insulin g. Parathyroid hormone
10.6.2 – Pathophysiology, Causes, Incidence, Morbidity, and Mortality, Assessment Findings, Management for Endocrine Conditions	
C 10.6.2.1 - Discuss the morbidity/mortality, preventative strategies, pathophysiology, assessment findings, and management of endocrine emergencies.	1. Pancreas disorders – Diabetes mellitus a. Insulin (relationship with glucose) b. Pathophysiology of diabetes i. Long-term complications ii. Impact on prehospital assessment c. Diabetes i. Type 1 (formerly known as juvenile or Type I) ii. Type 2 (formerly known as adult-onset or Type II) iii. Gestational d. Drugs to manage diabetes i. Insulins 1. Types 2. Delivery methods ii. Oral agents 1. Classes 2. Risks of hypoglycemia 3. Drug interactions iii. Other hypoglycemic agents iv. Drugs to treat hypoglycemia e. Diabetic ketoacidosis f. Hyperglycemic hyperosmolar nonketotic coma g. Hypoglycemia

	i. Pathophysiology ii. Signs and symptoms iii. Management 1. Pharamacologic 2. Non-pharmacologic h. Other disorders of the pancreas 2. Thyroid disorders a. Hyperthyroidism b. Hypothyroidism c. Myxedema d. Thyroid storm e. Thyrotoxicosis f. Grave's disease 3. Adrenal disorders a. Addison disease b. Cushing syndrome 4. Other endocrine disorders
10.6.3 – Consider Age-Related Variations	
C 10.6.3.1 - Identify differences in endocrine emergencies affecting pediatric and geriatric patients.	1. Pediatric a. Usually Type 1 diabetes b. Late stages of hyperglycemia may have cerebral edema c. Prone to seizures d. Prone to dehydration e. Congenital adrenal hyperplasia f. Panhypopituitarism g. Inborn errors of metabolism 2. Geriatric a. Can mask signs and symptoms of myocardial infarction b. Prone to dehydration and infections
10.6.4 – Communication and Documentation	
C 10.6.4.1. - Discuss communication and documentation considerations for patients with endocrine emergencies.	N/A
10.6.5 – Transport Decisions	
C 10.6.5.1 - Discuss transport considerations for patients with endocrine emergencies.	N/A
10.6.6 – Patient Education and Prevention	
C 10.6.6.1 - Discuss patient education and prevention of complications or future endocrine emergencies.	N/A

10.7 – Psychiatric

Objective	Educational Standard
10.7.1 – Introduction	
C 10.7.1.1 – Discuss the prevalence of behavioral and psychiatric disorders, the medical legal considerations for the management of patients with such disorders, and the importance of ensuring safety (patient, providers, and others) while assisting these patients.	1. Prevalence 2. Medical legal considerations 3. Safety
10.7.2 – Pathophysiology	
C 10.7.2.1 – Discuss the pathophysiology of behavioral and psychiatric disorders.	1. Biological/organic 2. Environment a. Psychosocial b. Socio-cultural 3. Injury and illness 4. Substance-related a. Abuse b. Dependence c. Intoxication d. Medication non-compliance
10.7.3 – Understanding Behavior	
C 10.7.3.1 – Define different types of behavior.	1. Normal 2. Abnormal 3. Overt 4. Violent
10.7.4 – Acute Psychosis	
C 10.7.4.1 – Discuss the pathophysiology, signs and symptoms, and prehospital management of acute psychosis.	1. Pathophysiology a. Related to mental illness b. Organic psychosis 2. Signs and symptoms 3. Prehospital management a. Non-pharmacologic b. Pharmacologic
10.7.5 – Agitated Delirium	
C 10.7.5.1 – Discuss the pathophysiology, risk factors, signs and symptoms, and management of agitated delirium.	1. Pathophysiology 2. Risk factors 3. Signs and symptoms 4. Management
10.7.6 – Specific Behavioral/Psychiatric Disorders	
C 10.7.6.1 – Differentiate between different behavioral/psychiatric disorders.	1. Cognitive disorders 2. Thought disorders a. Schizophrenia b. Psychosis 3. Mood disorders a. Bipolar b. Depression 4. Neurotic disorders 5. Substance-related disorders/addictive behavior 6. Somatoform disorders

	7. Factitious disorders 8. Fastidious disorders 9. Impulse control disorders 10. Personality disorders 11. Suicide 12. Patterns of violence, abuse, and neglect
10.7.7 – Assessment Findings for Behavioral/Psychiatric Patients	
C 10.7.7.1 – Discuss potential assessment findings for behavioral/psychiatric patients.	1. Mental status exam ("MSE") a. Consciousness b. Orientation c. Activity d. Speech e. Thought f. Memory g. Affect and mood h. Perception 2. Psychological changes 3. Medical/social history 4. Consider if patient is danger to self and/or others 5. Consider medical causes of acute crises
10.7.8 – Providing Empathetic and Respectful Management	
C 10.7.8.1 – Discuss techniques for providing empathetic and respectful management of patients experiencing a behavioral emergency.	1. Communication techniques 2. Crisis intervention skills 3. Use of force/restraints (chemical, physical, tasers)
10.7.9 – Medications	
C 10.7.9.1 – Discuss medications used in the management of behavioral/psychiatric disorders, problems associated with non-compliance, and those available for emergency use by paramedics.	1. Pharmacodynamics of prescribed medications for behavioral/psychiatric disorders a. Amphetamines b. Antidepressants c. Antipsychotic d. Phenothiazines 2. Problems associated with non-compliance 3. Emergency use
10.7.10 – Consider Age-Related Variations in Pediatric and Geriatric Patients	
C 10.7.10.1 - Identify differences in behavioral emergencies affecting pediatric and geriatric patients.	N/A
10.7.11 – Communication to Medical Facility and Documentation	
C 10.7.11.1 - Discuss communication and documentation considerations for patients with behavioral emergencies.	N/A
10.7.12 – Transport Decisions	
C 10.7.12.1 - Discuss transport considerations for patients with behavioral emergencies.	N/A

10.8 – Cardiovascular

Objective	Educational Standard
10.8.1 – Anatomy of the Cardiovascular System	
C 10.8.1.1 – Describe the anatomy of the cardiovascular system.	1. Layers a. Myocardium b. Endocardium c. Pericardium i. Visceral (epicardium) ii. Parietal iii. Pericardial fluid 2. Chambers a. Atria b. Ventricles 3. Valves a. Atrioventicular (AV) valves i. Tricuspid (right) ii. Mitral (left) b. Semilunar valves i. Pulmonic (right) ii. Aortic (left) 4. Papillary muscles 5. Chordae tendineae 6. Myocardial blood supply a. Arteries i. Left coronary artery 1. Anterior descending artery (“LAD”) a. Distribution to the conduction system b. Distribution to the left and right ventricles 2. Circumflex artery a. Distribution to the conduction system b. Distribution to the left ventricle c. Distribution to the left atrium ii. Right coronary artery 1. Posterior descending artery a. Distribution to the conduction system b. Distribution to left and right ventricles 2. Marginal artery a. Distribution to the conduction system b. Distribution to the right ventricle c. Distribution to the right atrium b. Veins i. Coronary sinus ii. Great cardiac vein 7. Conduction system a. Sinoatrial node b. Atrioventricular node c. Atrioventricular bundle (Bundle of His) d. Bundle branches i. Left anterior fascicle ii. Left posterior fascicle

	iii. Right e. Purkinje network f. Internodal and interatrial pathways i. Atrioventricular node ii. Left atrium (Bachmann's bundle) iii. Middle internodal tract (Wenckebach's tract) iv. Posterior internodal tract (Thorel's tract) g. Anatomical tracts that bypass the atrioventricular node – Considered possible conduction routes that account for anomalous atrioventricular conduction (Wolff-Parkinson-White syndrome, Lown-Ganong-Levine syndrome) i. James fibers ii. Mahaim fibers iii. Accessory bundle of Kent 8. Vascular system a. Aorta i. Ascending ii. Thoracic iii. Abdominal b. Arteries c. Arterioles d. Capillaries e. Venules f. Veins g. Vena cava i. Superior ii. Inferior h. Venous return (preload) i. Skeletal muscle pump ii. Thoracoabdominal pump iii. Respiratory cycle iv. Gravity v. Effects of IPPB, PEEP, CPAP, and BiPAP on venous return i. Systemic vascular resistance and capacitance (afterload) j. Pulmonary veins
10.8.2 – Physiology	
C 10.8.2.1 – Describe the physiology of the cardiovascular system.	1. Cardiac cycle a. Consists of systole and diastole of atria and ventricles b. Cycle occurs in about 0.8 seconds and 70 to 80 cycles per minute (average) c. Events that occur in one cardiac cycle: i. Atrial systole 1. AV valves open and SL valves closed 2. Ventricles relaxed 3. Preceded by P wave on ECG ii. Isovolumetric contraction 1. Between start of ventricular systole and opening of SL valves 2. Ventricular volume remains constant 3. Onset coincides with R wave on ECG

4. First heart sound (S_1)
    a. Caused by ventricles contracting and closure of cuspid valves
    b. "Lubb" sound
iii. Ejection – Initial, shorter, rapid ejection followed by longer phase of reduced ejection
    1. Residual volume of blood remains in ventricles following ejection phase
    2. Residual volume increases in states of heart failure
iv. Isovolumetric relaxation
    1. Period between closure of SL valves and opening of AV valves
    2. Ventricles are relaxing
    3. Second heart sound heard during this phase (S_2)
        a. Caused by closure of SL valves
        b. "Dubb" sound
v. Rapid ventricular filling
vi. Reduced ventricular filling (diastasis)

2. Cardiac output (heart rate *x* stroke volume)
    a. Starling's law
    b. Contractility

10.8.3 – Electrophysiology

C 10.8.3.1 – Discuss the electrophysiology of the cardiovascular system.

1. Characteristics of myocardial cells
    a. Automaticity
    b. Excitability
    c. Conductivity
    d. Contractility
2. Electrical potential
    a. Action potential – Important electrolytes
        i. Sodium
        ii. Potassium
        iii. Calcium
        iv. Chloride
        v. Magnesium
    b. Excitability
        i. Thresholds
        ii. Depolarization
        iii. Repolarization
            1. Relative refractory period
            2. Absolute refractory period
    c. Neurotransmitters
        i. Acetylcholine
            1. Effects on myocardium
            2. Effects on systemic blood vessels
        ii. Cholinesterase
            1. Effects on myocardium
            2. Effects on system blood vessels
3. Autonomic nervous system relationship to cardiovascular system
    a. Medulla
    b. Carotid sinus and baroreceptor
        i. Location

	ii. Significance c. Parasympathetic system i. Inhibitory ii. Vagal release of acetylcholine d. Sympathetic system i. Stimulatory ii. Release of norepinephrine iii. Alpha receptors iv. Beta receptors 1. Inotropic effect 2. Dromotropic effect 3. Chronotropic effect
10.8.4 – Epidemiology	
C 10.8.4.1 – Discuss the incidence, morbidity/mortality, risk factors, and possible contributing risks associated with cardiovascular disease, along with prevention strategies that may reduce the morbidity and mortality of cardiovascular disease.	1. Incidence a. Prevalence of cardiac death outside of a hospital b. Prevalence of prodromal signs and symptoms c. Increased recognition of the need for early reperfusion 2. Morbidity/mortality a. Reduced with early recognition b. Reduced with early access to the EMS system 3. Risk factors a. Age b. Family history c. Hypertension d. Lipids i. Hypercholesterolemia ii. LDL/HDL ratios e. Gender f. Smoking g. Carbohydrate intolerance 4. Possible contributing risks a. Diet b. Gender c. Obesity d. Oral contraceptives e. Sedentary living f. Personality type g. Psychosocial tensions 5. Prevention strategies a. Early recognition b. Education c. Alteration of life style
10.8.5 – Primary Survey for Cardiovascular Assessment	
C 10.8.5.1 – Discuss the primary survey as applied to a cardiovascular assessment.	1. Level of responsiveness 2. Airway a. Patent b. Debris, blood 3. Breathing a. Absent b. Present c. Rate and depth i. Effort

	ii. Breath sounds 1. Characteristics 2. Significance 4. Circulation a. Pulse i. Absent ii. Present 1. Pulse deficit 2. Pulsus paradoxus 3. Pulsus alternans b. Skin i. Color ii. Temperature iii. Moisture iv. Turgor v. Mobility vi. Edema c. Blood pressure
10.8.6 – History and Physical/SAMPLE Format	
C 10.8.6.1 – Discuss the history and physical/SAMPLE format as applied to a cardiovascular assessment.	1. Chief complaint 2. Pain a. OPQRST i. O – Onset/Origin 1. Pertinent past history 2. Tim of onset ii. P – Provocation 1. Exertional 2. Non-exertional iii. Q – Quality iv. R – Region/Radiation v. S – Severity vi. T – Timing 1. Duration 2. Worsening or improving 3. Continuous or intermittent 4. At rest or with activity 3. Dyspnea a. Continuous or intermittent b. Exertional c. Non-exertional d. Orthopneic 4. Cough a. Dry b. Productive 5. Related signs and symptoms a. Level of consciousness b. Diaphoresis c. Restlessness, anxiety d. Feeling of impending doom e. Nausea/vomiting f. Fatigue g. Palpitations h. Edema

	i. Extremities ii. Sacral i. Headache j. Syncope k. Behavioral change l. Anguished facial expression m. Activity limitations n. Trauma 6. Past medical history a. Coronary artery disease b. Atherosclerotic heart disease i. Abnormal lipid metabolism or excessive intake or saturated fats and cholesterol ii. Subendothelial accumulation of fatty streaks iii. Altered endothelial function iv. Disruption of endothelium v. Formation of mature fibrous plaque vi. Resultant diseases 1. Angina 2. Previous MI 3. Hypertension 4. Congestive heart failure c. Valvular disease d. Aneurysm e. Pulmonary disease f. Diabetes g. Renal disease h. Vascular disease i. Inflammatory cardiac disease j. Previous cardiac surgery k. Congenital anomalies l. Current/past medications i. Prescribed 1. Compliance 2. Non-compliance ii. Borrowed iii. Over-the-counter iv. Home remedies v. Recreational m. Allergies n. Family history i. Stroke, heart disease, diabetes, hypertension ii. Age at death o. Known cholesterol levels
10.8.7 – Secondary Survey for Cardiovascular Assessment	
C 10.8.7.1 - Discuss the secondary survey as applied to a cardiovascular assessment.	1. Inspection a. Tracheal position b. Neck veins i. Appearance ii. Pressure iii. Clinical significance c. Thorax i. Configuration

	ii. A-P diameter iii. Movement with respirations d. Epigastrium i. Pulsation ii. Distention iii. Clinical significance 2. Auscultation a. Neck i. Abnormal ii. Normal b. Breath sounds i. Depth ii. Equality iii. Adventitious sounds 1. Crackles/rales 2. Wheezes/ronchi a. Gurgling b. Frothing (mouth and nose) i. Blood tinged ii. Foamy c. Heart sounds i. Auscultatory sites ii. Identify S_1, S_2 iii. Identify abnormal sounds (S_3, S_4) 3. Palpation a. Areas of crepitus or tenderness b. Thorax c. Epigastrium i. Pulsation ii. Distention
10.8.8 – Electrocardiographic (ECG) Monitoring	
C 10.8.8.1 – Discuss the electrophysiology of the heart.	1. Origination 2. Production 3. Relationship of cardiac events to wave forms 4. Intervals a. Normal b. Clinical significance 5. Segments
C 10.8.8.2 – Describe proper placement of ECG leads/electrodes.	1. Electrode 2. Leads a. Anatomic positions b. Correct placement 3. Surfaces of heart and lead systems a. Inferior b. Left lateral c. Anterior/posterior 4. Artifact
C 10.8.8.3 – Describe the ways in which ECG outputs/strips are standardized.	1. Amplitude 2. Height 3. Rate a. Duration b. Wave form c. Segment

	d. Complex 4. Interval
C 10.8.8.4 – Describe the ECG waveform and its analysis.	1. Isoelectric 2. Positive 3. Negative 4. Calculation of ECG heart rate a. Regular rhythm i. ECG strip method ii. "300"/triplicate method b. Irregular rhythm i. ECG strip method ii. "300"/triplicate method
C 10.8.8.5 – Describe the heart surfaces shown by each lead system.	1. ECG rhythm analysis a. Value b. Limitations 2. Heart surfaces a. Interior b. Left lateral c. Precordial 3. Acute signs of ischemia, injury, and necrosis a. Rationale i. Possible early identification of patients with acute myocardial infarction for intervention (thrombolysis PTCA) ii. The role of out-of-hospital 12-lead ECG is not universally available, but is appropriate in most EMS settings with proper medical oversight b. Advantages c. ST segment elevation i. Height, depth, and contour ii. ST (acute changes) 1. Anterior wall – Significant ST elevation in V1 to V4 may indicate anterior involvement 2. Inferior wall – Significant ST elevation in II, III, and aVF may indicate inferior involvement iii. ST segment depression in eight or more leads iv. ST segment elevation in aVR and V1 d. Q waves – Depth, duration, and significance i. Greater than 5mm, greater than 0.4 seconds ii. May indicate necrosis iii. May indicate extensive transient ischema
C 10.8.8.6 – Describe the steps used to analyze and interpret an ECG.	1. Approach to analysis a. P wave i. Configuration ii. Duration iii. Atrial rate and rhythm b. P-R (P-Q) interval c. QRS complex i. Configuration ii. Duration iii. Ventricular rate and rhythm

	d. ST segment i. Contour ii. Elevation iii. Depression e. Q-T interval i. Duration ii. Implication of prolongation f. Relationship of P waves to QRS complexes i. Consistent ii. Progressive prolongation iii. No relationship g. T waves h. U waves 2. Interpretation of the ECG a. Origin of complex b. Rate c. Rhythm d. Clinical significance
P 10.8.8.7 – Identify cardiac arrhythmias.	1. Arrhythmia originating in the sinus node a. Sinus bradycardia b. Sinus tachycardia c. Sinus arrhythmia d. Sinus arrest 2. Arrhythmias originating in the atria a. Premature atrial complex b. Atrial (ectopic) tachycardia c. Reentry tachycardia d. Multifocal atrial tachycardia e. Atrial flutter f. Atrial fibrillation g. Atrial flutter or atrial fibrillation with junctional rhythm h. Atrial flutter or atrial fibrillation with pre-excitation syndromes 3. Arrhythmias originating within the AV junction a. First degree AV block b. Second degree AV block i. Type I (Wenkebach) ii. Type II / Infranodal (classical) c. Third degree AV block (complete) 4. Arrhythmias sustained by or originating in the AV junction a. AV nodal reentry tachycardia b. AV reciprocating tachycardia i. Narrow ii. Wide c. Junctional escape rhythm d. Premature junctional complex e. Accelerated junctional rhyghm f. Junctional tachycardia 5. Arrhythmias originating in the ventricles a. Idioventricular rhythm b. Accelerated idioventricular rhythm c. Premature ventricular complex (ventricular ectopic)

i. R on T phenomenon
ii. Paired/couplets
iii. Multiformed
iv. Frequent uniform

d. "Rule of bigeminy" pertaining to precipitating ventricular arrhythmias
e. Ventricular tachycardia
i. Monomorphic
ii. Polymorphic (including torsades de pointes)
f. Ventricular fibrillation
g. Ventricular standstill
h. Asystole

6. Abnormalities originating within the bundle branch
a. Incomplete or complete
b. Right bundle branch block
c. Left bundle branch block
7. Differentiation of wide QRS complex tachycardia
a. Potential causes
i. Supraventricular tachycardia with bundle branch block
ii. Accessory pathways
b. Differentiation
i. Physical evaluation
1. Cannon "A" waves
2. Vary intensity of first heart tone
3. Beat-to-beat changes in blood pressure
ii. ECG differences
1. Aberration as a result of premature atrial complex
a. Identify PAC in previous ST segment or T wave
b. Sudden change in rate with bundle branch aberration
c. Concealed retrograde conduction
d. Right bundle branch refractoriness (may be time dependent)
e. Compare with previous ECG, when available
2. RBBB aberration – V_1 positive
a. Biphasic leace I with a broad terminal S wave
b. Triphasic QRS in V_4
3. LBBB aberration – V_1 negative
a. Monophasic notched lead I
b. Slurred, notched, or RSr' in lead V_4, V_5, or V_6
4. Concordant precordial pattern
a. Totally negative precordial pattern is diagnostic of ventricular tachycardia
b. Totally positive precordial pattern is suggestive of ventricular tachycardia
5. Preexisting BBB prior to onset of tachycardia (by history)
iii. Other considerations
1. When in doubt:

	a. Cardioversion when hemodynamic state is compromised or changing as evidenced by CNS changes b. Never use verapamil c. If hemodynamic state is stable, consider lidocaine 2. Pitfalls a. Age is not a differential b. Slower rates may be present with stable hemodynamic c. Preexisting BBB prior to onset of the tachycardia 3. Regularity a. Monomorphic V tach and SVT are usually very regular and SVT frequently is faster b. Polymorphic V tach is irregular 8. Pulseless electrical activity a. Electrical mechanical dissociation b. Mechanical impairments to pulsations/cardiac output c. Other possible causes 9. Other ECG phenomena a. Accessory pathways b. Preexitation phenomenon c. Aberration versus ectopy 10. ECG changes due to electrolyte imbalances a. Hyperkalemia b. Hypokalemia 11. ECG changes in hypothermia
P 10.8.8.8 – Apply ECG procedures.	1. ECG Monitor 2. 12-lead ECG
10.8.9 – Management of the Patient with an Arrhythmia	
C 10.8.9.1 – Discuss possible assessment findings of a patient with a cardiac arrhythmia.	1. Symptomatic 2. Hypotensive 3. Hypoperfusion 4. Mechanical 5. Vagal maneuvers (if the heart rate is too fast) 6. Stimulation (if the heart rate is too slow) 7. Cough
C 10.8.9.2 – Identify pharmacological interventions available for the treatment of cardiac arrhythmias.	1. Gases 2. Sympathomimetic 3. Anticholinergic 4. Antiarrhythmic 5. Beta blocker a. Selective b. Non-selective 6. Vasopressor 7. Calcium channel blocker 8. Purine nucleoside 9. Platelet aggregate inhibitor 10. Alkalinizing agents 11. Cardiac glycoside

	12. Narcotic/analgesic 13. Diuretic 14. Nitrate 15. Antihypertensive
C 10.8.9.3 – Discuss electrical interventions available for the treatment of cardiac arrhythmias.	1. Purpose 2. Methods a. Synchronized cardioversion b. Defibrillation c. Cardiac pacing i. Implanted pacemaker functions 1. Characteristics 2. Pacemaker artifact 3. ECG tracing of capture 4. Failure to sense a. ECG indications b. Clinical significance 5. Failure to capture a. ECG indications b. Clinical significance 6. Failure to pace a. ECG indications b. Clinical significance 7. Pacer-induced tachycardia a. ECG findings b. Clinical significance c. Refer to ILCOR Concensus for treatment ii. Transcutaneous pacing – Criteria for use 1. Bradycardia a. Patient is hypotensive/hypoperfusing with CNS involvement b. Refer to ILCOR Consensus for treatment 2. Second degree AV block a. Patient is hypotensive/hypoperfusing with CNS involvement b. Refer to ILCOR Consensus for treatment 3. Third degree AV block a. Patient is hypotensive/hypoperfusing with CNS involvement b. Refer to ILCOR Consensus for treatment d. Setup i. Placement of electrodes ii. Rate and milliampere (mA) settings iii. Pacer artifact iv. Capture v. Failure to sense 1. Causes 2. Implications 3. Interventions vi. Failure to capture 1. Causes 2. Implications

	3. Interventions vii. Failure to pace 1. Causes 2. Implications 3. Interventions viii. Hazards ix. Complications
C 10.8.9.3 – Discuss transport considerations for a patient with a cardiac arrhythmia.	1. Indications for rapid transport 2. Indications for no transport required 3. Indications for referral
C 10.8.9.4 – Discuss support and communication strategies when addressing the patient, family members, medical direction, the receiving facility, and others.	1. Explanation for patient, family, and significant others 2. Communication and transfer of data to the physician
P 10.8.9.5 – Apply electrical therapy.	1. Cardioversion – electrical 2. Defibrillation a. Automated (AED) b. Semi-aotomated (AED) c. Manual 3. Transcutaneous pacing
P 10.8.9.6 – Apply "mechanical" (non-electrical) cardiovascular interventions.	1. Cardiocerebral resuscitation ("CCR") 2. Cardiopulmonary resuscitation ("CPR") 3. CPR mechanical device 4. Pericardiocentesis 5. Valsalva 6. Carotid massage 7. Hemorrhage control a. Direct pressure b. Tourniquet c. Hemostatic agents 8. Trendelenberg positioning
10.8.10 – Acute Coronary Syndrome	
C 10.8.10.1 - Discuss the precipitating causes, morbidity/mortality, pathophysiology, assessment findings, management, and communication strategies associated with acute coronary syndrome.	1. Epidemiology 2. Precipitating causes a. Atherosclerosis b. Vasospastic (Prinzmetal's) 3. Morbidity/mortality a. Not a self-limiting disease b. Chest pain may dissipate, but myocardial ischemia and injury can continue c. A single angina episode may be a precursor to myocardial infarction d. May not be cardiac in origin e. Must be diagnosed by a physician f. Related terminology i. Defined as a brief discomfort; has predictable characteristics and is relieved promptly (no change in this pattern) ii. Stable 1. Occurs at a relative fixed frequency 2. Usually relieved by rest and/or medication

iii. Unstable
1. Occurs without fixed frequency
2. May or may not be relieved by rest and/or medication
iv. Initial (first episode)
v. Progressive (accelerating in frequency and duration)
vi. Preinfarction angina
1. Pain at rest
2. Sitting or lying down

g. Differential diagnoses
i. Cholecystitis
ii. Acute viral pericarditis or any other inflammatory cardiac disease
iii. Aneurysm
iv. Hiatal hernia
v. Esophageal disease
vi. Gastric reflux
vii. Pulmonary embolism
viii. Peptic ulcer disease
ix. Pancreatitis
x. Chest wall syndrome
xi. Costochondritis
xii. Acromioclavicular disease
xiii. Pleural irritation
xiv. Respiratory infections
xv. Aortic dissection
xvi. Pneumothorax
xvii. Dyspepsia
xviii. Herpes zoster
xix. Chest wall tumors
xx. Chest wall trauma

4. Primary survey findings
a. Airway/breathing – Labored breathing may or may not be present
b. Circulation
i. Peripheral pulses
1. Quality
2. Rhythm
ii. Peripheral perfusion – Changes in skin (color, temperature, and moisture)

5. History of the present illness/SAMPLE history
a. Chief complaint
i. Typical – Sudden onset of discomfort, usually of brief duration, lasting three to five minutes, maybe five to 15 minutes; never 30 minutes to two hours
ii. Typical – Usually relieved by rest and/or medication
iii. Epigastric pain or discomfort
iv. Atypical
b. Denial
c. Contributing history
i. Initial recognized event
ii. Recurrent event

	iii. Increasing frequency and/or duration of event 6. Secondary survey findings a. Airway b. Breathing i. May be clear to auscultation ii. May be congested in the bases c. Circulation i. Alterations in heart rate and rhythm may occur ii. Peripheral pulses are usually not affected iii. Blood pressure may be elevated during the episode and normalize afterward iv. ECG devices 1. Monitor 2. Transmission 3. Documentation 4. Computerized pattern identification 5. Pitfalls 6. Common errors v. Findings 1. ST segment changes are often not specific 2. Arrhythmias and ectopy may not be present 7. Management a. Position of comfort b. Refer to ILCOR Consensus for treatment c. ECG i. Whenever possible, and scene time is not delayed, record and transmit 3-lead and/or 12-lead ECG during pain, since ECG may be normal during the pain-free period ii. Measure, record, and communicate ST segment changes d. Indications for rapid transport i. Sense of urgency for reperfusion ii. No relief with medications iii. Hypotension/hypoperfusion with CNS involvement iv. Significant changes in ECG e. No transport i. Patient refusal ii. Referral 8. Support and communications strategies a. Explanation for patient, family, and significant others b. Communications and transfer of data to the physician
10.8.11 – Acute Myocardial Infarction/Angina	
C 10.8.11.1 - Discuss the precipitating causes, morbidity/mortality, pathophysiology, assessment findings, management, and communication strategies associated with acute	1. Epidemiology 2. Precipitating causes (as with angina) a. Atherosclerosis b. Persistent angina c. Occlusion

myocardial infarction/angina.

d. Non-traumatic (recreational drugs)
e. Trauma

3. Morbidity/mortality
   a. Sudden death
   b. Extensive myocardial damage
   c. May result in ventricular fibrillation
4. Primary survey findings
   a. Airway/breathing
   b. Circulation
      i. Peripheral pulses
         1. Quality
         2. Rhythm
      ii. Peripheral perfusion (changes in skin)
         1. Color
         2. Temperature
         3. Moisture
5. History of the present illness/SAMPLE history
   a. Chief complaint
      i. Typical onset of discomfort, usually of long duration, over 30 minutes
      ii. Typically unrelieved by rest and/or nitroglycerin preparation
      iii. Epigastric pain or discomfort
      iv. Atypical
   b. Contributing history
      i. First time
      ii. Recurrent
      iii. Increasing frequency and/or duration
   c. Denial
6. Secondary survey findings
   a. Airway
   b. Breath sounds
      i. May be clear to auscultation
      ii. Congestion in bases may be present
   c. Circulation
      i. Skin
         1. Pallor during the episode
         2. Temperature may vary
         3. Diaphoresis is usually present
      ii. Alterations in heart rate and rhythm may occur
      iii. Peripheral pulses are usually not affected
      iv. Blood pressure may be elevated or lowered
      v. ECG findings
         1. ST segment elevation
            a. Height, depth, and contour
            b. ST changes
            c. ST segment depression in reciprocal leads
         2. Q waves
            a. Depth, duration, and significance
            b. Greater than 5 mm, greater than 0.04 seconds
            c. May indicate necrosis
            d. May indicate extensive transient

	ischemia 3. ECG rhythm analysis a. Criteria for patient selection for rapid transport and reperfusion b. Value c. Signs of acute ischemia, injury, and necrosis d. Criteria for patient selection for rapid transport and reperfusion i. Time of onset of pain ii. Location of ischemia and infarction iii. ST segment elevation e. Cardiac arrhythmias i. Sinus tachycardia with or without ectopy ii. Narrow or wide QRS complex tachycardia iii. Sinus bradycardia iv. Heart blocks v. Ventricular fibrillation vi. Pulseless electrical activity ("PEA") vii. Asystole (confirmed in a second lead) 7. Management a. Position of comfort b. Refer to ILCOR Consensus for treatment c. Transport i. Criteria for rapid transport 1. No relief with medications 2. Hypotension/hypoperfusion 3. Significant changes in ECG a. Ectopy b. Arrhythmias ii. ECG criteria for rapid transport and reperfusion 1. Time of onset of pain 2. ECG rhythm abnormalities d. Indications for "no transport" i. Refusal ii. No other indications for no-transport e. Support and communications strategies i. Explanation for patient, family, and significant others ii. Communications and transfer of data to the physician
10.8.12 – Heart Failure	
C 10.8.12.1 - Discuss the precipitating causes, morbidity/mortality, pathophysiology, assessment findings, management, and communication strategies associated with heart failure.	1. Epidemiology 2. Precipitating causes a. Left-sided failure b. Right-sided failure c. Myocardial infarction d. Pulmonary embolism

e. Hypertension
f. Cardiomegaly
g. High output failure
h. Low output failure

3. Related terminology
   a. Preload
   b. Afterload
   c. Congestive heart failure
   d. Chronic versus acute
      i. First time event
      ii. Multiple events
4. Morbidity/mortality
   a. Pulmonary Edema
   b. Respiratory failure
   c. Death
5. Primary survey
   a. Airway/breathing
   b. Circulation
      i. Peripheral pulses
         1. Quality
         2. Rhythm
      ii. Peripheral perfusion – Changes in skin color (color, temperature, and moisture)
6. History of present illness/SAMPLE history – Chief complaint
   a. Progressive or acute SOB
   b. Progressive accumulation of edema
   c. Weight gain over short period of time
   d. Episodes of paroxysmal nocturnal dyspnea
   e. Prescribed medication history
      i. Compliance
      ii. Non-compliance
      iii. Borrowed
      iv. Over-the-counter
      v. Home remedies
   f. Home oxygen use
7. Secondary survey findings
   a. Level of consciousness
      i. Unconscious
      ii. Altered levels of consciousness
   b. Airway/breathing
      i. Dyspnea
      ii. Productive cough
      iii. Labored breathing
         1. Most common, often with activity
         2. Paroxysmal nocturnal dyspnea (“PND”)
         3. Tripod position
         4. Adventitious sounds
         5. Retraction
   c. Circulation
      i. Heart rate/rhythm
         1. Any tachycardia with ectopy
         2. Any bradycardia with ectopy
         3. Atrial arrhythmias
      ii. Changes in skin

	1. Color 2. Temperature 3. Moisture iii. Peripheral pulses 1. Quality 2. Rhythm iv. Edema 1. Pitting versus non-pitting 2. Extremities a. Localized in ankles b. To the midcalf c. To the knees d. Obliteration of pulses 3. Ascites 4. Sacral 8. Complications – Pulmonary edema (signs and symptoms) a. Tachypnea b. Wheezing/ronchi c. Crackles/rales at both bases d. Frothy sputum e. Elevated jugular venous pressure f. Pulsus paradoxus g. Rapid "thread" pulse h. Pulsus alternans i. Cyanosis in advanced stages j. Abnormalities of apical pulse i. Due to displaced cardiac apex ii. Abnormal bulges 9. Management a. Position of comfort b. Refer to ILCOR Consensus for treatment c. Transport i. Refusal ii. No other indications for no-transport 10. Support and communications strategies a. Explanation for patient, family, and significant others b. Communications and transfer of data to the physician
10.8.13 – Non-Traumatic Cardiac Tamponade	
C 10.8.13.1 - Discuss the precipitating causes, morbidity/mortality, pathophysiology, assessment findings, management, and communication strategies associated with non-traumatic cardiac tamponade.	1. Pathophysiology – Defined as impaired diastolic filling of the heart caused by increased intrapericardiac pressure 2. Precipitating causes a. Gradual onset with neoplasm or infection b. Acute onset with infarction c. Trauma i. Can occur with CPR ii. Penetrating injury iii. Non-penetrating injury d. Secondary to renal disease e. Hypothyroidism

	3. Morbidity/mortality 4. Primary survey a. Airway/breathing b. Circulation i. Peripheral pulses 1. Quality 2. Rhythm ii. Peripheral perfusion 1. Skin color 2. Temperature 3. Moisture 5. History of the present illness/SAMPLE history (consider precipitating causes listed above) 6. Secondary survey a. Airway/breathing i. Dyspnea ii. Orthopnea b. Circulation i. Pulse rate and rhythm ii. Chest pain iii. Tachycardia iv. Ectopy v. Elevated venous pressures (early sign) vi. Decreased systolic pressure (early sign) vii. Narrowing pulse pressure (early sign) viii. Pulsus paradoxus ix. Heart sounds normal early on, progressively faint or muffled x. ECG changes 1. Low voltage QRS and T waves 2. ST elevation or non-specific T wave changes 3. Electrical alternans of PQRST 4. Usually inconclusive (should not be used as a diagnostic tool) 7. Management a. Airway management and ventilation b. Refer to ILCOR Consensus for treatment c. Rapid transport for pericardiocentesis 8. Support and communications strategies a. Explanation for patient, family, and significant others b. Communications and transfer of data to the physician
10.8.14 – Hypertensive Emergencies	
C 10.8.14.1 - Discuss the precipitating causes, morbidity/mortality, pathophysiology, assessment findings, management, and communication strategies associated with hypertensive emergencies.	1. Epidemiology 2. Precipitating causes a. History of hypertension b. Non-compliance with medication or any other treatment c. Toxemia of pregnancy 3. Morbidity/mortality a. Hypertensive encephalopathy b. Stroke

4. Primary examination
    a. Airway/breathing
    b. Circulation
        i. Peripheral pulses
            1. Quality
            2. Rhythm
        ii. Peripheral perfusion
            1. Changes in skin color
            2. Changes in skin temperature
            3. Changes in skin moisture
5. History of the present illness/SAMPLE history (consider precipitating causes listed above)
    a. Chief complaint
    b. Medication history
        i. Prescribed
            1. Compliance
            2. Non-compliance with medication or treatment
        ii. Borrowed
        iii. Over-the-counter
        iv. Home remedies
    c. Home oxygen use
6. Secondary survey
    a. Airway
    b. Circulation
        i. Pulse
        ii. Vital signs
    c. Diagnostic signs/symptoms
        i. General appearance
        ii. Level of consciousness
            1. Unconscious
            2. Altered level of consciousness
            3. Responsive
        iii. Skin color
        iv. Skin hydration
        v. Skin temperature
        vi. Peripheral pulses
        vii. Edema
        viii. Paroxysmal nocturnal dyspnea
        ix. Labored breathing (SOB)
        x. Orthopnea
        xi. Vertigo
        xii. Epistaxis
        xiii. Tinnitus
        xiv. Changes in visual acuity
        xv. Nausea/vomiting
        xvi. Seizures
        xvii. Lateralizing signs
        xviii. ECG findings
7. Management
    a. Position of comfort
    b. Airway and ventilation
    c. Refer to ILCOR Consensus for treatment
    d. Rapid transport
        i. Refusal

	ii. No other indications for no transport 8. Support and communications strategies a. Explanation for patient, family, and significant others b. Communications and transfer of data to the physician
10.8.15 – Cardiogenic Shock	
C 10.8.15.1 - Discuss the precipitating causes, morbidity/mortality, pathophysiology, assessment findings, management, and communication strategies associated with cardiogenic shock.	1. Pathophysiology 2. Precipitating causes a. Myocardial infarction b. Age c. Trauma 3. Primary survey a. Airway/breathing b. Circulation i. Peripheral pulses 1. Quality 2. Rhythm ii. Peripheral perfusion 1. Changes in skin color 2. Changes in skin temperature 3. Changes in skin moisture 4. History of the present illness/SAMPLE history (consider precipitating causes listed above) a. Chief complaint b. Medication history i. Prescribed 1. Compliance 2. Non-compliance ii. Borrowed iii. Over-the-counter iv. Home remedies 5. Secondary survey – Critical findings a. Unconscious b. Altered levels of consciousness c. Airway i. Dyspnea ii. Productive cough iii. Labored breathing 1. Paroxysmal nocturnal dyspnea (“PND”) 2. Tripod position 3. Adventitious sounds 4. Retraction d. ECG rhythm analysis i. Any tachycardia ii. Atrial arrhythmias iii. Ectopics e. Changes in skin i. Color ii. Temperature iii. Moisture f. Peripheral pulses i. Quality ii. Rhythm

	g. Edema i. Pitting versus non-pitting ii. Extremities iii. Obliteration of pulses iv. Sacral 6. Management a. Position of comfort b. Refer to ILCOR Consensus for treatment c. Transport i. Refusal ii. No other indications for no transport 7. Support and communications strategies a. Explanation for patient, family, and significant others b. Communications and transfer of data to the physician
10.8.16 – Cardiac Arrest	
C 10.8.16.1 - Discuss the precipitating causes, morbidity/mortality, pathophysiology, assessment findings, management, and communication strategies associated with cardiac arrest.	1. Pathophysiology 2. Precipitating cause a. Trauma b. Medical conditions (for example) i. End stage renal disease ii. Hyperkalemia with renal disease 3. Primary survey critical findings a. Unresponsive b. Apneic c. Peripheral pulses absent d. Heart rate/rhythm i. Ventricular fibrillation ii. Ventricular tachycardia iii. Asystole iv. PEA 4. History of the present illness/SAMPLE history (consider precipitating causes listed above) a. Witnessed event b. Witnessed by EMS personnel c. Bystander cardiopulmonary resuscitation (“CPR”) d. Time from discover to activation of CPR e. Time from discover to activation of EMS f. Past medical history 5. Management a. Related terminology i. Resuscitation – To provide efforts to return spontaneous pulse and breathing to the patient in full cardiac arrest ii. Survival – Patient is resuscitated and survives to hospital discharge iii. 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 b. Indications for withholding resuscitation efforts c. Advanced airway management and ventilation

d. Circulation
e. IV therapy as appropriate
f. Refer to ILCOR Consensus for treatment
g. Rapid transport

6. Support and communications strategies
   a. Explanation for patient, family, and significant others
   b. Communications and transfer of data to the physician
7. Termination of resuscitation efforts
   a. Inclusion criteria (for example)
      i. 18 or older
      ii. Arrest is presumed cardiac in origin and not associated with a condition potentially responsive to hospital treatment (for example: hypothermia, drug overdose, toxicologic exposure, etc.)
      iii. Endotracheal intubation has been successfully accomplished and maintained
      iv. Standard advanced cardiac life support ("ACLS") measures have been applied throughout the resuscitative effort
      v. On-scene ALS resuscitation efforts have been sustained for 25 minutes or the patient remains in asystole through four rounds of appropriate ALS drugs
      vi. Patient has a cardiac rhythm of asystole or agonal rhythm at the time the decision to terminate is made and this rhythm persist until the arrest is actually terminated
      vii. Victims of blunt trauma in arrest whose presenting rhythm is asystole, or who develop asystole while on scene
   b. Exclusion criteria (for example)
      i. Under the age of 18 years
      ii. Etiology for which specific in-hospital treatment may be beneficial
      iii. Persistent or recurrent ventricular tachycardia or fibrillation
      iv. Transient return of pulse
      v. Signs of neurological viability
      vi. Arrest was witnessed by EMS personnel
      vii. Family or responsible party opposed to termination
   c. Criteria not to be considered as inclusionary or exclusionary
      i. Patient age (for example, geriatric)
      ii. Time of collapse prior to EMS arrival
      iii. Presence of a non-official do-not-resuscitate ("DNR") order
      iv. "Quality of life" valuations
   d. Procedures (according to local protocol) – Direct communication with medical oversight
      i. Medical condition of the patient
      ii. Known etiologic factors

	iii. Therapy rendered iv. Family present and apprised of the situation v. Communicate any resistance or uncertainty on the part of the family vi. Maintain continuous documentation to include the ECG vii. Mandatory review after the event 1. Grief support (according to local protocol) a. EMS assigned personnel b. Community agency referral 2. Law enforcement (according to local protocol) a. On-scene determination if the event/patient requires assignment of the patient to the medical examiner b. On-scene law enforcement communicates with attending physician for the death certificate c. If there is any suspicion about the nature of the death, or if the physician refuses or hesitates to sign the death certificate d. No attending physician is identified (the patient will be assigned to the medical examiner)
10.8.17 – Vascular Disorders	
C 10.8.17.1 - Discuss the precipitating causes, morbidity/mortality, pathophysiology, assessment findings, management, and communication strategies associated with vascular disorders.	1. Epidemiology a. Trauma b. Non-traumatic c. Precipitating causes i. Atherosclerosis ii. Aneurysm 1. Atherosclerotic 2. Dissecting 3. Infections 4. Congenital iii. Marfan's syndrome iv. Inflammation 1. Arterial 2. Peripheral arterial atherosclerotic disease v. Occlusive disease 1. Trauma 2. Thrombosis 3. Tumor 4. Embolus 5. Idiopathic vi. Venous thrombosis 1. Phlebitis 2. Varicose veins 2. Morbidity/mortality a. Pulmonary occlusion b. Cerebral occlusion c. Mesenteric occlusion d. Hypoperfusion state

e. Death
3. Primary survey
   a. Airway/breathing
   b. Circulation (distal to or over the affected area)
      i. Pain
      ii. Pallor
      iii. Pulselessness
      iv. Paralysis
      v. Parethesia
   c. Skin
      i. Pallor or mottled distal to or over the affected area
      ii. Skin temperature may vary
4. History of the present illness/SAMPLE history (consider precipitating causes listed above)
   a. Chief complaint
      i. Sudden or gradual onset of discomfort
      ii. May be localized
      iii. Pain
         1. Chest, abdominal, or involved extremity
            a. Sudden or gradual
            b. Radiating or localized
            c. Claudication
         2. Relief with rest or not
   b. Contributing history
      i. Initial recognized event
      ii. Recurrent event
      iii. Increasing frequency and/or duration of event
5. Secondary survey
   a. Airway
   b. Breath sounds – May be clear to auscultation
   c. Circulation
      i. Alterations in heart rate and rhythm may occur
      ii. Peripheral pulses absent or diminished over the affected extremity
      iii. Blood pressure
      iv. Bruit over affected vessel(s)
      v. Skin
         1. May be cool reflecting diminished circulation to the affected are or extremity
         2. May be moist or dry reflecting diminished circulation to the affected area or extremity
      vi. ECG findings may be non-contributory
6. Management
   a. Position of comfort
   b. Refer to ILCOR Consensus for treatment
   c. Transport
      i. Indications for rapid transport
         1. No relief with medications
         2. Hypotension/hypoperfusion
      ii. No transport
         1. Refusal
         2. Relief and refusal

	7. Support and communications strategies a. Explanation for patient, family, and significant others b. Communications and transfer of data to the physician
10.8.18 – Aortic Aneurysm/Dissection	
C 10.8.18.1 – Describe an aortic aneurysm/dissection.	1. Thoracic 2. Abdominal
10.8.19 – Thromboembolism	
C 10.8.19.1 – Describe a thromboembolism.	1. Arterial occlusion 2. Venous thrombosis
10.8.20 – Congenital Heart Disease	
C 10.8.20.1 – Discuss congenital heart disease.	1. Pulmonary stenosis a. Stenosis of pulmonary valve b. Increased resistance to outflow c. Elevates right ventricular pressure d. Limits pulmonary blood flow 2. Septal defects a. Atrial – Blood from left atrium passes into right atrium b. Ventricular – Blood from left ventricle passes into right ventricle 3. Patent ductus arteriosus a. Ductus arteriosus fails to close during embryonic development b. Blood flow continuously from aorta through ductus into the pulmonary artery c. Increases workload of left ventricle
10.8.21 – Valvular Heart Disease	
C 10.8.21.1 – Describe valvular heart disease.	1. Stenosis 2. Regurgitation
10.8.22 – Coronary Artery Disease	
C 10.8.22 – Discuss coronary artery disease.	1. Atherosclerosis 2. Intravascular lesion a. Coronary vasospasm i. Reduced blood flow ii. Decreased oxygen delivery to myocardium iii. May be drug induced (cocaine) b. Plaque rupture i. Vasoconstriction ii. Platelet adherence iii. Thrombus formation 1. Partial occlusion 2. Complete occlusion
10.8.23 – Infectious Diseases of the Heart	
C 10.8.23.1 – Discuss infectious diseases of the heart.	1. Result from intravascular contamination by pathogen a. Endocarditis b. Pericarditis c. Myocarditis

	2. Damages heart valves 3. Damages heart muscle 4. Embolizes
10.8.24 – Cardiomyopathy	
C 10.8.24.1 – Describe cardiomyopathy.	1. Dilated 2. Hypertrophic
10.8.25 – Specific Hypertensive Emergencies	
C 10.8.25.1 – List specific hypertensive emergencies.	1. Accelerated and malignant hypertension 2. Hypertensive encephalopathy 3. Intracranial hemorrhage 4. Acute left ventricular failure 5. Acute cardiac ischemia 6. Acute aortic dissection 7. Eclampsia
10.8.26 – Infectious Diseases of the Heart	
C 10.8.26.1 - Discuss the precipitating causes, morbidity/mortality, pathophysiology, assessment findings, and management of infectious diseases of the heart.	1. Epidemiology a. Incidence b. Morbidity and mortality c. Risk factors i. Injection drug use ii. Recent dental surgery iii. Permanent central venous access lines iv. Prior valve surgery v. Weakened valves d. Prevention strategies 2. Pathophysiology a. Chronic versus acute i. First time event ii. Multiple events b. Involvement i. Heart muscle ii. Heart valves iii. Heart lining 3. Specific disease a. Endocarditis b. Pericarditis c. Rheumatic fever d. Scarlet fever 4. Assessment a. Primary examination b. Secondary examination 5. Management (refer to ILCOR Consensus treatment) a. Initial general therapy b. Management of arrhythmias c. Adjunctive prehospital therapy 6. Consider age-related variations for pediatric and geriatric patients
10.8.27 – Congenital Abnormalities and Age-Related Variations	
C 10.8.27.1 - Discuss the precipitating	1. Epidemiology a. Incidence

causes, morbidity/mortality, pathophysiology, assessment findings, and management of congenital cardiac abnormalities, including age-related variations.	b. Morbidity and mortality c. Risk factors d. Prevention strategies 2. Pathophysiology a. Causes i. Genetic mutations ii. Environmental insults 1. Maternal rubella 2. Maternal ingestion of alcohol 3. Maternal ingestion of drugs or certain medications b. Altered embryonic development of heart structures i. Visible ii. Microscopic c. Malformations lead to altered cardiac function and hemodynamics 3. Specific diseases a. Left-to-right shunt i. Coarctation of the aorta ("CoA") ii. Atrial septal defect ("ASD") iii. Ventricular septal defect ("VSD") iv. Patent ductus arteriosus ("PDA") v. Truncus arteriosus vi. Congestive heart failure b. Valvular and vascular lesions i. Tricuspid atresia ii. Hypoplastic left heart syndrome ("HLHS") iii. Tetralogy of Fallot ("ToF") c. Transposition i. Transposition of the great arteries ("TGA") ii. Total anomalous pulmonary venous return ("TAPVR") d. Congenital arrhythmias i. Heart blocks ii. Supraventricular tachycardia 4. Assessment a. Primary examination b. Secondary examination 5. Management (refer to ILCOR Consensus treatment) a. Initial general therapy b. Management of arrhythmias c. Adjunctive prehospital therapy
10.8.28 – Integration	
P 10.8.28.1 – Apply pathophysiological principles to the assessment of a patient with cardiovascular disease.	N/A
P 10.8.28.2 – Formulate a field impression for a patient with cardiovascular disease.	1. Primary examination 2. History of the present illness/SAMPLE history 3. Secondary examination
P 10.8.28.3 – Develop a patient management plan based on the field impression.	1. Initial management a. Airway support b. Ventilation support c. Circulation support

	d. Non-pharmacological interventions e. Pharmacological interventions f. Electrical interventions 2. Reassessment 3. Transport criteria a. AAppropriate mode b. Appropriate facility 4. Non-transport criteria 5. Advocacy 6. Communications 7. Prevention 8. Documentation 9. Quality assurance
P 10.8.28.3 – Execute a patient management plan based on the field impression	N/A

10.9 – Toxicology

Objective	Educational Standard
10.9.1 – Epidemiology of Toxicology Emergencies	
C 10.9.1.1 – Discuss the epidemiology of toxicology, including types of emergencies, pharmacokinetics, and routes of exposure.	1. Review of epidemiology of poisoning a. Local b. Regional c. National 2. National resources for poisoning a. National Poison Control Center b. National Courses in Toxicology c. Centers for Disease Control and Prevention ("CDC") 3. Types of toxicological emergencies a. Unintentional poisoning i. Dosage errors ii. Idiosyncratic reactions iii. Childhood poisoning iv. Environmental exposure v. Occupational exposure b. Drug/alcohol abuse c. Intentional poisoning/overdose i. Chemical warfare ii. Assault/homicide iii. Suicide attempts 4. Pharmacokinetics 5. Routes of exposure a. Ingestion i. Examples ii. Anatomy and physiology review 1. Absorption 2. Distribution iii. Assessment findings iv. General management considerations b. Inhalation i. Examples ii. Anatomy and physiology review 1. Absorption 2. Distribution iii. Assessment findings iv. General management considerations c. Injection i. Examples 1. Intravenous drug abuse 2. Venomous bites and stings ii. Anatomy and physiology review 1. Absorption 2. Distribution iii. Assessment findings iv. General management considerations d. Absorption i. Examples ii. Anatomy and physiology review

	1. Absorption 2. Distribution iii. Assessment findings iv. General management considerations
10.9.2 – Toxic Syndromes (Toxidromes) Including Drugs of Abuse	
C 10.9.2.1 – Discuss the pathophysiology, incidence, risk factors, methods of transmission, complications, assessment findings, and patient management considerations associated with toxic syndromes.	1. Pathophysiology, incidence, toxic agents, risk factors, methods of transmission, and complications 2. Cholinergics a. Common causative agents – Pesticides (organophosphates, carbamates) and nerve agents (Sarin, Soman) b. Assessment findings and symptoms for patients with exposure to cholinergics i. Headache, dizziness, weakness, and nausea ii. SLUDGE (salivation, lacrimation, urination, defecation, GI upset, emesis) iii. Bradycardia, wheezing, bronchoconstriction, myosis, coma, and convulsions iv. Diaphoresis, seizures c. Management for a patient with exposure to cholinergics i. Decontamination ii. Airway, ventilation, and circulation iii. Pharmacological 1. Atropine 2. Pralidoxime chloride ("2-PAM") 3. Diazepam 4. Activated charcoal iv. Non-pharmacological 3. Anticholinergic a. Common causative agents b. Assessment findings and symptoms for patients with exposure to anticholinergics i. Delirium, flushed skin, dilated pupils, and urinary retention ii. Memory loss, seizures c. Management for a patient with exposure to anticholinergics i. Airway and ventilation ii. Pharmacological iii. Non-pharmacological 4. Marijuana and cannabis compounds a. Common causative agents b. Assessment findings and symptoms for patients with exposure/use of cannabis c. Management for a patient with exposure to cannabis i. Airway, ventilation and circulation ii. Pharmacological iii. Non-pharmacological

5. Sympathomimetics/stimulates
    a. Common causative agents
        i. Cocaine
        ii. Methamphetamine
        iii. Ecstacy
        iv. ICE
        v. Other
    b. Assessment findings and symptoms for patients with exposure to/use of sympathomimetics/stimulates
        i. Agitated delirium
        ii. Hypertensive emergencies
        iii. Psychosis/seizures
        iv. Malignant hyperthermia
        v. Cardiac damage
    c. Management for a patient with exposure to/use of sympathomimetics/stimulates
        i. Airway, ventilation, and circulation
        ii. Pharmacological / sedation / restraint
        iii. Non-pharmacological
6. Barbiturates/sedatives/hypnotics
    a. Common causative agents
    b. Assessment findings and symptoms for patients with exposure to/use of barbiturates/sedatives/hypnotics
        i. Respiratory depression/respiratory arrest
        ii. Hypotension
        iii. CNS
    c. Management for a patient with exposure to/use of barbiturates/sedatives/hypnotics
        i. Airway, ventilation and circulation
        ii. Pharmacological
        iii. Non-pharmacological
7. Hallucinogens
    a. Common causative agents
        i. Lysergic acid diethylamide (“LSD”)
        ii. Phencyclidine (“PCP”)
        iii. Peyote, mushrooms, jimson weed, and mescaline
        iv. Other
    b. Assessment findings and symptoms for patients with exposure to/use of hallucinogens
        i. CNS and behavioral
        ii. Chest pain
    c. Management for a patient with exposure to/use of hallucinogens
        i. Airway, ventilation, and circulation
        ii. Pharmacological / sedation / restraint
        iii. Non-pharmacological
8. Opiates
    a. Common causative agents
        i. Heroin, morphine, methadone
        ii. Codeine, meperidine, propoxyphene

	iii. Fentanyl, lortab, oxycotin iv. Other b. Assessment findings and symptoms for patients with exposure to/use of opiates i. CNS – Euphoria, decreased level of consciousness, sedation ii. Hypotension iii. Respiratory depression/arrest iv. Nausea, pinpoint pupils v. Seizures and coma c. Management for a patient with exposure to/use of opiates i. Airway, ventilation, and circulation ii. Pharmacological / sedation / restraint iii. Non-pharmacological 9. Huffing agent (halogenated hydrocarbons) a. Common causative agents b. Assessment findings and symptoms for patients with exposure to/use of huffing agents i. Cardiovascular collapse and ventricular arrhythmias ii. Seizure iii. Psychosis c. Management for a patient with exposure to/use of huffing agents i. Airway, ventilation, and circulation ii. Pharmacological / sedation / restraint iii. Non-pharmacological
10.9.3 – Alcoholism	
C 10.9.3.1 - Discuss the pathophysiology, incidence, risk factors, morbidity/mortality, complications, assessment findings, and patient management considerations associated with alcoholism.	1. Epidemiology, risk factors, morbidity/mortality, and complications 2. Pathophysiology of long term and acute alcohol abuse and withdrawal a. End organ damage i. Brain ii. Liver iii. Heart iv. Bone v. Pancreas b. Assessment findings and symptoms for patients with acute and chronic alcohol abuse and withdrawal c. Management for a patient with acute or chronic alcohol abuse and/or withdrawal. i. Airway, ventilation, and circulation ii. Pharmacological/restraint iii. Non-pharmacological
10.9.4 – Poisonings and Exposures	
C 10.9.4.1 – Discuss potential chemicals, assessment findings and symptoms, and management considerations associated with chemical poisoning and exposures.	1. Agents a. Cyanide b. Solvents c. Carbon monoxide d. Alcohols

	e. Hydrocarbons f. Caustics g. Metals h. Hydrogen fluoride i. Hydrogen sulfide j. Oxides of nitrogen k. Ammonia l. Chlorine 2. Assessment findings and symptoms for patients with chemical poisoning/exposure 3. Management for a patient with chemical poisoning/exposure a. Airway, ventilation, and circulation b. Pharmacological c. Non-pharmacological
10.9.5 – Household Poisons	
C 10.9.5.1 - Discuss potential agents, assessment findings and symptoms, and management considerations associated with household poison/chemical exposures.	1. Pesticides a. Organophosphates b. Carbamates c. Warfarins d. Pyrethrums (Raid) 2. Household cleaning poisonings a. Bleach b. Cleaning agents c. Pine oil products 3. Poisonous plants a. China berry b. Foxglove c. Mistletoe d. Dieffenbachia e. Others 4. Assessment findings and symptoms for patients with poisoning/exposure to household poisons 5. Management for a patient with chemical poisoning/exposure to household poisons a. Airway, ventilation, and circulation b. Pharmacological c. Non-pharmacological
10.9.6 – Medication Overdose (Introduction: Pathophysiology, Incidence, Toxic Agents, Risk Factors, and Complications)	
C 10.9.6.1 - Discuss the pathophysiology, incidence, risk factors, complications, assessment findings, and patient management considerations associated with a medication overdose.	1. Pathophysiology, incidence, toxic agents, risk factors, and complications 2. Medications a. Cardiac medications b. Psychiatric medications c. Non-prescription pain medications, including salicylates and acetaminophen d. Other 3. Assessment findings and symptoms for patients with a medication overdose 4. Management for a patient with a medication

	overdose a. Airway, ventilation, and circulation b. Pharmacologic c. Non-pharmacologic
10.9.7 – General Treatment Modalities for Poisonings	
C 10.9.7.1 – Discuss general treatment modalities for poisoning emergencies.	1. Facilitated airway control 2. Respiratory support 3. Circulation support 4. Antidote therapy a. Methylene blue b. Cyanide antidotes c. Physostigmine d. Alkalization and sodium bicarbonate e. Atropine and pralidoxime ("2-PAM") f. Narcan g. Sedatives h. Solu-medros, decadron i. Beta agonist j. Ipecac k. Haldol l. Glucagon m. Flumazenil n. Dimercapel o. Digibind p. Calcium gluconate q. Activated charcoal 5. Decontamination
10.9.8 – Communication and Documentation for Patients with Toxicological Emergencies	
C 10.9.8.1 – Discuss communication and documentation considerations for patients with toxicological emergencies.	N/A
10.9.9 – Transport Decisions with Toxicological Emergencies	
C 10.9.9.1 – Discuss transport considerations for patients with toxicological emergencies.	N/A
10.9.10 – Age-Related Variations for Pediatric and Geriatric Patients	
C 10.9.10.1 - Identify differences in toxicological emergencies affecting pediatric and geriatric patients.	N/A
10.9.11 – Patient Education and Prevention of Toxicological Emergencies and Drug and Alcohol Abuse	
C 10.9.11.1 – Discuss patient education and prevention of complications or future toxicological emergencies.	N/A

10.10 – Respiratory

Objective	Educational Standard
10.10.1 – Introduction	
C 10.10.1.1 – Discuss the epidemiology of pulmonary diseases and conditions.	1. Mortality/morbidity 2. Risk factors a. Intrinsic factors that increase the risk of developing respiratory disease i. Genetic predisposition ii. Associated cardiac or circulatory pathologies iii. Stress b. Extrinsic factors that increase the risk of developing respiratory disease i. Smoking ii. Environmental pollutants
C 10.10.1.2 – Identify the structures (and respective functions) of the pulmonary system	1. Global physiology of the pulmonary system a. Function b. Physiology i. Ventilation ii. Diffusion iii. Perfusion 2. Anatomy of the pulmonary system a. Upper airway i. Functions ii. Structures 1. Nose 2. Pharynx 3. Larynx b. Lower airway i. Functions ii. Structures 1. Trachea 2. Bronchi 3. Bronchioles 4. Cilia c. Gas exchange interface i. Functions ii. Structures 1. Alveoli 2. Interstitial space 3. Pulmonary capillary bed d. Chest wall i. Functions ii. Structures 1. Diaphragm is the major muscle of respiration 2. Intercostal muscles 3. Accessory muscles 4. Pleural space e. Neurologic control of breathing i. Functions ii. Structures 1. Medulla 2. Phrenic nerve innervate the

	diaphragm 3. Spinal nerves (thoracic levels) innervate the intercostal 4. Hering-Breuer reflex prevents overinflation
10.10.2 – General System Pathophysiology, Assessment, and Management	
C 10.10.2.1 – Discuss the pathophysiology of specific respiratory emergencies/conditions.	1. Ventilation a. Upper airway obstruction i. Trauma ii. Epiglottitis iii. Laryngotracheobronchitis iv. Abscess v. Foreign body obstruction vi. Inflammation of the tonsils b. Lower airway obstruction i. Trauma ii. Obstructive/restrictive lung diseases 1. Emphysema 2. Chronic bronchitis iii. Mucous accumulation iv. Reactive airway disease – Smooth muscle spasm including asthma v. Airway edema c. Chest wall impairment i. Spontaneous pneumothorax ii. Pleural inflammation and effusion iii. Neuromuscular diseases (such as muscular sclerosis or muscular dystrophy) 2. Diffusion a. Inadequate oxygen concentration in ambient air b. Alveolar pathology i. Asbestosis, other environmental lung diseases ii. Blebs/bullaes associated with chronic obstructive lung disease iii. Inhalation injuries c. Interstitial space pathology d. Adult respiratory distress syndrome (“ARDS”) e. Submersion/drowning 3. Perfusion a. Inadequate blood volume/hemoglobin levels i. Hypovolemia ii. Anemia b. Impaired circulatory blood flow
C 10.10.2.2 – Discuss potential assessment findings for a patient suffering from a respiratory emergency/condition.	1. Scene size-up a. Pulmonary complaints may be associated with exposure to a wide variety of toxins, including carbon monoxide, toxic products of combustion, or environments that have deficient ambient oxygen (such as silos, enclosed storage spaces, etc.)

b. It is critical to assure a safety environment for all EMS personnel before initiating patient contact

2. Initial assessment – Signs of life-threatening respiratory distress
   a. Alterations in mental status
   b. Absent alveolar breath sounds
   c. Cyanosis
   d. Audible stridor/grunting respirations
   e. One-two word dyspnea
   f. Tachycardia > 130 beats per minute
   g. Pallor and diaphoresis
   h. Presence of retractions/use of the accessory muscles
   i. Nasal flaring
3. Focused history and physical examination
   a. Chief complaint
      i. Dyspnea
      ii. Chest pain
      iii. Cough
         1. Productive
         2. Non-productive
         3. Hemoptysis
      iv. Wheezing
      v. Signs of infection
         1. Fever/chills
         2. Increased sputum production
   b. History
      i. Previous experiences with similar/identical symptoms
      ii. Known pulmonary diagnosis
      iii. History of previous intubation
      iv. Medication history
         1. Current medications
         2. Medication allergies
         3. Pulmonary medications
            a. Sympathomemetic
            b. Corticosteroid
            c. Chromolyn sodium
            d. Methylxanthines (theophylline preparations)
            e. Antibiotics
            f. Other
         4. Cardiac-related drugs
      v. History of the present episode
      vi. Exposure/smoking history
   c. Physical examination
      i. General impression
         1. Position
         2. Mentation
         3. Ability to speak
         4. Respiratory effort
         5. Color
      ii. Vital signs
         1. Pulse

	a. Tachycardia is a sign of hypoxemia and the use of sympathomimetic medications b. In the face of a pulmonary etiology, bradycardia is an ominous sign of severe hypoxemia and imminent cardiac arrest 2. Blood pressure 3. Respiratory rate a. The respiratory rate is not a very accurate indicator of respiratory status unless it is very slow b. Trends are essential in evaluating the chronic patient 4. Respiratory patterns a. Eupnea b. Tachypnea c. Cheyne-Stokes d. Central neurogenic hyperventilation e. Kussmaul f. Ataxic (Biot's) g. Apneustic h. Apnea iii. Head/neck 1. Pursed lip breathing 2. Use of accessory muscles 3. Sputum 4. Jugular venous distention iv. Chest 1. Signs of trauma 2. Barrel chest 3. Retractions 4. Symmetry 5. Breath sounds a. Normal b. Abnormal v. Extremities 1. Peripheral cyanosisClubbing 2. Carpopedal spasm d. Diagnostic testing i. Pulse oximetry ii. Peak flow iii. End-tidal carbon dioxide assessment 1. Capnometry 2. Capnography
C 10.10.2.3 - Discuss the prehospital management of a patient suffering from a respiratory emergency/condition	1. Airway and ventilation 2. Circulation (intravenous therapy) 3. Pharmacological 4. Non-pharmacological (CPAP) 5. Monitoring and devices used in pulmonary care a. Pulse oximetry b. Peak flow c. Capnometry or capnography

	d. Other 6. Transport considerations
10.10.3 – Specific Illness/Injuries: Causes, Assessment Findings, and Management for Each Condition	
C 10.10.3.1 – Discuss the causes, assessment findings, and management of specific respiratory emergencies/conditions.	1. Acute/adult respiratory distress syndrome 2. Chronic obstructive airway diseases a. Asthma b. Chronic bronchitis c. Emphysema d. Pneumonia e. Pulmonary edema i. High pressure (cardiogenic) 1. Acute myocardial infarction 2. Chronic hypertension 3. Myocarditis ii. High permeability (non-cardiogenic) 1. Acute hypoxemia 2. Drowning 3. Post cardiac arrest 4. Post shock 5. High altitude exposure 6. Inhalation of pulmonary irritants 7. Adult respiratory distress syndrome ("ARDS") f. Pulmonary thromboembolism g. Neoplasms of the lung h. Pertussis i. Cystic fibrosis j. Upper respiratory infection k. Spontaneous pneumothorax l. Hyperventilation syndrome
10.10.4 – Consider Age-Related Variations	
C 10.10.4.1 – Discuss differences in respiratory emergencies/conditions affecting pediatric patients.	1. Anatomic and physiologic differences in children 2. Pathophysiology a. Respiratory distress b. Respiratory failure c. Respiratory arrest 3. Upper airway obstruction a. Croup b. Foreign body aspiration c. Bacterial tracheitis d. Epiglottitis e. Tracheostomy dysfunction 4. Lower airway disease a. Asthma b. Bronchiolitis c. Pneumonia d. Foreign body lower airway obstruction e. Pertussis f. Cystic fibrosis g. Bronchopulmonary dysplasia

10.10.5 – Communication and Documentation for Patients with a Respiratory Condition or Emergency	
C 10.10.5.1 – Discuss communication and documentation considerations for patients with respiratory emergencies/conditions.	N/A
10.10.6 – Transport Decisions	
C 10.10.6.1 – Discuss transport considerations for patients with respiratory emergencies/conditions.	N/A
10.10.7 – Patient Education and Prevention of Complications or Future Respiratory Emergencies	
C 10.10.7.1 – Discuss patient education and prevention of complications or future respiratory emergencies.	N/A

10.11 – Hematology

Objective	Educational Standard
10.11.1 – Introduction	
C 10.11.1.1 – Discuss the incidence and morbidity/mortality of hematological emergencies.	1. Incidence 2. Morbidity/mortality
C 10.11.1.2 – Describe the anatomy and physiology of the circulatory system as it relates to hematology.	1. Blood 2. Plasma 3. Blood-forming organs 4. Normal red cell production, function, and destruction 5. Normal white cell production and function 6. The inflammatory process 7. Immunity a. Cellular immunity b. Humoral immunity c. Autoimmune diseases 8. Blood groups 9. Hemostasis a. Vascular components b. Coagulation mechanisms
10.11.2 – General Assessment Findings and Symptoms	
C 10.11.2.1 – Discuss common general assessment findings and symptoms for hematological conditions or emergencies.	1. Level of consciousness 2. Skin 3. Visual disturbances 4. Gastrointestinal 5. Skeletal 6. Cardiorespiratory 7. Genitourinary
10.11.3 – General Management for a Patient with a Hematological Condition or Emergency	
C 10.11.3.1 – Discuss the general prehosptial management of a patient with a hematological emergency or condition.	1. Airway, ventilation, and circulation 2. Pharmacological 3. Non-pharmacological 4. Transport considerations 5. Psychological/communication strategies
10.11.4 – Sickle Cell Disease	
C 10.11.4.1. – Discuss the pathophysiology, mortality/morbidity, and management of a sickle cell crisis.	1. Types of emergent presentations a. Vaso-occlusive crisis i. Description ii. Signs and symptoms iii. Implications b. Acute chest syndrome i. Description ii. Signs and symptoms iii. Implications c. Acute splenic sequestration syndrome (pediatric) i. Description ii. Signs and symptoms

	iii. Implications 2. Patient management a. Administer high-concentration oxygen b. Initiate IV therapy (administer IV fluids to hydrate) c. Maintain nomothermic d. Rest e. Pain management
10.11.5 – Hematological Conditions	
C 10.11.5.1 – Describe the pathophysiology, mortality/morbidity, complications, assessment findings and symptoms, and specific management considerations for various hematological conditions or emergencies.	1. Definitions, pathophysiology, epidemiology, mortality and morbidity, and complications 2. Specific assessment findings and symptoms 3. Specific management considerations 4. Conditions a. Sickle cell crisis b. Anemia i. Types ii. Hemolytic iii. Sickle cell c. Leukopenia d. Thrombocytopenia e. Leukemia f. Lymphomas g. Polycythemia h. Disseminated intravascular coagulopathy i. Hemophilia j. Hemophilia A (deficiency in factor VIII) k. Hemophilia B (deficiency in factor IX) l. Multiple myeloma m. Homestatic disorders
10.11.6 – Blood Transfusion Complications	
C 10.11.6.1 – List blood transfusion complications.	1. Hemolytic 2. Febrile 3. Allergic 4. Transfusion-related lung injury 5. Circulator overload 6. Bacterial infection
10.11.7 – Consider Age-Related Variations in Pediatric and Geriatric Patients	
C 10.11.7.1 – Identify differences in hematological conditions or emergencies affecting pediatric and geriatric patients.	N/A
10.11.8 – Patient Education and Prevention	
C 10.11.8.1 – Discuss patient education and prevention of complications or future hematological emergencies.	N/A

10.12 – Genitourinary/Renal

Objective	Educational Standard
10.12.1 – Introduction	
C 10.12.1.1 – Describe the general anatomy and functions of the urinary system.	1. General anatomy a. Structure of the kidneys, ureters, bladder, and urethra b. Structure and function of the nephron 2. Functions of the urinary system a. Regulating water and electrolytes b. Regulating acid-base c. Excreting waste products and foreign chemicals d. Regulating arterial blood pressure e. Producing red blood cells f. Producing glucose
10.12.2 – Renal Diseases	
C 10.12.2.1 – Discuss the pathophysiology, incidence, morbidity/mortality, assessment findings, symptoms, and management of renal disease emergencies.	1. Overview of renal conditions a. Pathophysiology i. Prerenal – Decreased blood flow to kidneys ii. Intrarenal – Disease or damage within the kidneys iii. Postrenal – Blockage to urine collecting system b. Incidence, morbidity, and mortality i. Acute renal failure 1. Definition 2. Causes ii. Chronic renal failure 1. Definition 2. Causes iii. End stage renal disease (“ESRD”) 2. Assessment findings and symptoms for renal failure a. Acute renal failure i. Reduced or no urinary output ii. Excessive urinary output at night iii. Lower extremity swelling iv. Neuropathies of hands and feet v. Anorexia vi. Altered mental status vii. Metallic taste in mouth viii. Tremors or seizures ix. Easy bruising or prolonged bleeding x. Flank pain xi. Tinnitus xii. Hypertension xiii. Abdominal pain or discomfort b. Chronic renal failure i. Headache ii. Weakness iii. Anorexia iv. Vomiting

v. Increased urination
vi. Rusty of brown-colored urine
vii. Increased thirst
viii. Hypertension
ix. Pruritis

c. End stage renal disease
i. Confusion
ii. Altered levels of consciousness
iii. Shortness of breath
iv. Peripheral edema
v. Chest pain
vi. Bone pain
vii. Pruritis
viii. Nausea, vomiting, diarrhea
ix. Bruising
x. Muscle twitching, tremors, seizures
xi. Hallucinations

3. Dialysis
a. Hemodialysis
i. Shunt
ii. Fistula
iii. Graft
iv. Blood filtered through dialysate
b. Peritoneal dialysis
c. Special considerations for hemodialysis patients
i. Obtaining blood pressure
ii. IV site, blood draw
d. Complications/adverse effects of dialysis
i. Hypotension
ii. Muscle cramps
iii. Nausea/vomiting
iv. Disequilibrium syndrome
v. Hemorrhage (especially from access site)
vi. Air embolism
vii. Myocardial ischemia
viii. Infection at access site
ix. Electrolyte imbalance
e. Missed dialysis treatment
i. Hyperkalemia with associated ECG changes
ii. Weakness
iii. Pulmonary edema
iv. Uremic frost

4. Management for a patient with acute renal condition, chronic renal conditions with acute exacerbations or dialysis problems, or end stage renal disease
a. ABCs, support ventilation, intubate if necessary
b. Stop bleeding from shunt as needed
c. IV (restrict fluids or give fluids based on need)
d. Pharmacological interventions

10.12.3 – Urinary System Conditions

C 10.12.3.1 - Discuss the pathophysiology, incidence, assessment findings, symptoms, and management of urinary system emergencies.

1. Urinary retention
   a. Pathophysiology, incidence and causes
   b. Assessment findings and symptoms
      i. Unable to urinate
      ii. Bladder enlargement/distention
      iii. Lower abdominal pain
      iv. Delirium, especially in elderly
   c. Management
      i. Primary supportive
      ii. Transport
      iii. IV TKO if abdominal pain
      iv. Insert catheter if local medical director approval
2. Urinary tract infection ("UTI")
   a. Pathophysiology, incidence, and causes
   b. Urinary bladder infection (cystitis)
   c. Pyelonephritis
   d. Assessment findings and symptoms
      i. Burning sensation or pain when urinating
      ii. Increased urgency and frequency of urination
      iii. Cloudy or rust-colored urine
      iv. Unusual or foul odor to urine
      v. Febrile in pyelonephritis
      vi. Back or flank pain in pyelonephritis
      vii. Blood in urine
      viii. Abdominal pain (suprapubic)
   e. Management
      i. Primarily supportive (IV is febrile or abdominal pain)
      ii. Transport
3. Renal calculi (kidney stones)
   a. Pathophysiology, incidence, and causes
   b. Assessment findings and symptoms
      i. Severe flank or back pain
      ii. Abdominal pain
      iii. Pain may radiate to pelvis, groin, or genitals
      iv. Increased urgency of urination
      v. Painful urination
      vi. Blood in urine
      vii. Febrile
      viii. Skin pale and clammy
   c. Management
      i. IV fluids
      ii. Transport in position of comfort
      iii. Pain analgesia as needed
         1. Narcotics
         2. Nitrous oxide
         3. May be drug seeking
4. Acid-base disturbances
   a. Pathophysiology, incidence, and causes

	b. Assessment findings and symptoms c. Management 5. Fluid and electrolyte a. Pathophysiology, incidence, and causes b. Assessment findings and symptoms c. Management 6. Infection a. Pathophysiology, incidence, and causes b. Assessment findings and symptoms c. Management
10.12.4 – Male Genital Tract Conditions	
C 10.12.4.1 – Discuss the pathophysiology, incidence, assessment findings, symptoms, and management of male genital tract conditions or emergencies.	1. Review of male reproductive system anatomy and physiology 2. Blunt trauma to external genitalia a. Assessment findings and symptoms i. Scrotum or penis (swollen and tender) ii. Severe pain iii. Blood at tip of penis b. Management i. Control bleeding ii. Cold compress iii. Assess and treat for shock or pelvic fracture 3. Epididymitis or orchitis a. Pathophysiology, incidence, and causes b. Assessment findings and symptoms i. Swelling and pain in the scrotums ii. Enlarged testes iii. Swollen groin on affected side iv. Testicular pain that worsens with bowel movement v. Fever vi. Urethral discharge c. Management i. Supportive ii. Analgesics may be needed 4. Fournier's gangrene a. Pathophysiology, incidence, and causes b. Assessment findings and symptoms i. Crepitus of skin ii. Gray-black color of tissues iii. Drainage of pus from tissues iv. Fever v. Scrotal pain c. Management i. Prompt transport to emergency department ii. Assess and treat for shock 5. Structural conditions a. Phimosis or paraphimosis i. Pathophysiology, incidence, and causes ii. Assessment findings and symptoms iii. Management 1. May apply cold compresses

	2. Prompt transport to facility b. Priapism i. Pathophysiology, incidence, and causes ii. Assessment findings and symptoms iii. Management 1. Pain control 2. May need surgical intervention c. Benign prostate hypertrophy ("BPH") – Pathology, incidence, and causes d. Testicular masses – Pathology, incidence, and causes e. Testicular torsion i. Pathophysiology, incidence, and causes ii. Assessment findings and symptoms 1. Sudden onset of severe pain in one testis 2. May occur with or without blunt trauma 3. Swelling on one side of scrotum 4. Testicular lump 5. Blood in semen iii. Management 1. Prompt transport 2. Care and comfort 3. Analgesics to control pain
10.12.5 – Consider Age-Related Variations for Pediatric and Geriatric Patients	
C 10.12.5.1 – Identify differences in genitourinary/renal conditions or emergencies affecting pediatric and geriatric patients.	N/A
10.12.6 – Communication and Documentation	
C 10.12.6.1 – Discuss communication and documentation considerations for patients with genitourinary/renal conditions or emergencies.	N/A
10.12.7 – Transport Decisions	
C 10.12.7.1 – Discuss transport considerations for patients with genitourinary/renal conditions or emergencies.	N/A
10.12.8 – Patient Education and Prevention	
C 10.12.8.1 – Discuss patient education and prevention of complications or future genitourinary/renal conditions or emergencies.	N/A

10.13 – Gynecology

Objective	Educational Standard
10.13.1 – Introduction	
C 10.13.1.1 – Describe the female reproductive system anatomy.	1. External genitalia 2. Internal organs and structures
10.13.2 – Physiology	
C 10.13.2.1 – Describe the female menstrual and ovarian cycles.	1. Proliferative phase 2. Secretory phase 3. Menstrual phase 4. Menopause
10.13.3 – Symptoms and Assessment Findings	
C 10.13.3.1 – Discuss potential symptoms and assessment findings related to a gynecological examination.	1. Abdominal and/or vaginal pain 2. Vaginal bleeding 3. Vaginal discharge 4. Fever 5. Nausea and vomiting 6. Syncope
10.13.4 – General Management	
C 10.13.4.1 – Discuss the general management of a patient with a gynecological condition or emergency.	1. Protect privacy and modesty 2. Communication techniques 3. Consider pregnancy and/or sexually transmitted diseases 4. Oxygen and IV fluids if needed
10.13.5 – Vaginal Bleeding	
C 10.13.5.1 – Discuss the pathophysiology, assessment findings, and management of a female patient with vaginal bleeding.	1. Anatomy and physiology 2. Epidemiology 3. Pathophysiology 4. Psychosocial impact 5. Assessment findings/presentation 6. Prognosis 7. Management a. Pharmacological b. Non-pharmacological
10.13.6 – Sexual Assault	
C 10.13.6.1 - Discuss the pathophysiology, assessment findings, and management of a female patient after a sexual assault.	1. Anatomy and physiology 2. Epidemiology 3. Pathophysiology 4. Psychosocial impact 5. Assessment findings/presentations 6. Prognosis 7. Management a. Pharmacological b. Non-pharmacological
10.13.7 – Infection (Including Pelvic Inflammatory Disease, Barthloin's Abscess, and Vaginitis/Vulvovaginitis)	
C 10.13.7.1 – Discuss the pathophysiology, assessment findings, and management of a female patient with a gynecological infection.	1. Pathophysiology 2. Assessment findings/presentation 3. Prehospital management

10.13.8 – Ovarian Cyst and Ruptured Ovarian Cyst	
C 10.13.8.1. – Discuss the pathophysiology, assessment findings, and management of a female patient with an ovarian cyst or ruptured ovarian cyst.	1. Pathophysiology 2. Assessment findings/presentation 3. Prehospital management
10.13.9 – Ovarian Torsion	
C 10.13.9.1 – Discuss the pathophysiology, assessment findings, and management of a female patient with ovarian torsion.	1. Pathophysiology 2. Assessment findings/presentation 3. Prehospital management
10.13.10 – Endometriosis	
C 10.13.10.1 – Discuss the pathophysiology, assessment findings, and management of a female patient with endometriosis.	1. Pathophysiology 2. Assessment findings/presentation 3. Prehospital management
10.13.11 – Dysfunctional Uterine Bleeding	
C 10.13.11.1 – Discuss the pathophysiology, assessment findings, and management of a female patient with dysfunctional uterine bleeding.	1. Pathophysiology 2. Assessment findings/presentation 3. Prehospital management
10.13.12 – Prolapsed Uterus	
C 10.13.12.1 - Discuss the pathophysiology, assessment findings, and management of a female patient with a prolapsed uterus.	1. Pathophysiology 2. Assessment findings/presentation 3. Prehospital management
10.13.13 – Vaginal Foreign Body	
C 10.13.13.1 – Discuss the pathophysiology, assessment findings, and management of a female patient with a vaginal foreign body.	1. Pathophysiology 2. Assessment findings/presentation 3. Prehospital management
10.13.14 – Age-Related Variations	
C 10.13.14.1 – Identify differences in gynecological conditions or emergencies affecting pediatric and geriatric patients.	1. Pediatrics – Menarche could be cause of bleeding. 2. Geriatrics – Menopausal women can get pregnant.
10.13.15 – Communication and Documentation	
C 10.13.15.1 – Discuss communication and documentation considerations for patients with gynecological conditions or emergencies.	N/A
10.13.16 – Transport Decisions	
C 10.13.16.1 – Discuss transport considerations for patients with gynecological conditions or emergencies.	N/A

10.14 – Non-Traumatic Musculoskeletal Disorders

Objective	Educational Standard
10.14.1 – Introduction	
C 10.14.1.1 – Discuss the incidence and morbidity/mortality of non-traumatic musculoskeletal disorders.	1. Epidemiology a. Incidence b. Morbidity/mortality 2. Anatomy and physiology review a. Bones b. Muscles c. Tendons and ligaments d. Articulating surfaces (joints, bursa, discs, etc.)
10.14.2 – General Assessment Findings and Symptoms	
C 10.14.2. – Discuss general assessment findings and symptoms associated with non-traumatic musculoskeletal disorders.	1. Pain or tenderness 2. Swelling 3. Abnormal or loss of movement 4. Sensation changes 5. Circulatory changes 6. Deformity
10.14.3 – General Management for a Patient with a common or Major Non-Traumatic Musculoskeletal Disorder	
C 10.14.3.1 – Discuss the general management of a patient with a non-traumatic musculoskeletal disorder or emergency.	1. Airway, ventilation, and circulation 2. Pharmacological 3. Non-pharmacological 4. Transport considerations 5. Psychological/communication strategies
10.14.4 – Non-Traumatic Musculoskeletal Conditions	
C 10.14.4.1 – Discuss the pathophysiology, assessment findings, and management of common non-traumatic musculoskeletal conditions or emergencies.	1. Bony abnormalities (including osteomyelitis and tumors) a. Epidemiology b. Anatomy, physiology, and pathophysiology c. Assessment d. Prehospital management 2. Disorders of the spine (including disc disorders, low back pain, cauda equine syndrome, sprains, and strains) a. Epidemiology b. Anatomy, physiology, and pathophysiology c. Assessment d. Prehospital management 3. Joint abnormalities (including arthritis [septic, gout, rheumatoid, osteoarthrosis] and slipped capital femoral epiphysis) a. Epidemiology b. Anatomy, physiology, and pathophysiology c. Assessment d. Prehospital management 4. Muscle abnormalities (myalgia/myositis, rhabdomyolsis)

	a. Epidemiology b. Anatomy, physiology, and pathophysiology c. Assessment d. Prehospital management 5. Overuse syndromes (including bursitis, muscle strains, peripheral nerve syndrome, carpal tunnel syndrome, tendonitis) a. Epidemiology b. Anatomy, physiology, and pathophysiology c. Assessment d. Prehospital management 6. Soft tissue infections (facitis, gangrene, paronychia, and flexor tenosynovitis of the hand)
10.14.5 – Consider Age-Related Variations in Pediatric and Geriatric Patients	
C 10.14.5.1. – Identify differences in non-traumatic musculoskeletal conditions or emergencies affecting pediatric and geriatric patients.	1. Pediatric – Slipped femoral epiphysis juvenile arthritis 2. Geriatric - Osteoporosis
10.14.6 – Patient Education and Prevention	
C 10.14.6.1 – Discuss patient education and prevention of complications or future non-traumatic musculoskeletal conditions or emergencies.	N/A

10.15 – Diseases of the Eyes, Ears, Nose, and Throat

Objective	Educational Standard
10.15.1 – Introduction	
C 10.15.1.1 – Discuss the incidence and morbidity/mortality of diseases affecting the eyes, ears, nose, and throat.	1. Epidemiology a. Incidence b. Morbidity/mortality 2. Anatomy and physiology review a. Eye b. Ear c. Nasal bones and nasopharynx d. Mouth, oral cavity, oropharynx, and larynx
10.15.2 – General Assessment Findings and Symptoms	
C 10.15.2.1 – Discuss general assessment findings and symptoms for diseases affecting the eyes, ears, nose, and throat.	1. Pain or tenderness 2. Swelling 3. Abnormal or loss of movement 4. Sensation changes 5. Circulatory changes 6. Deformity 7. Visual or hearing changes 8. Airway compromise
10.15.3 – General Management	
C 10.15.3.1. – Discuss the general prehospital management of patients with diseases affecting the eyes, ears, nose, and throat.	1. Airway, ventilation, and circulation 2. Pharmacological 3. Non-pharmacological 4. Transport considerations 5. Psychological/communication strategies
10.15.4 – Diseases of the Eyes, Ears, Nose, and Throat	
C 10.15.4.1 – Discuss the pathophysiology, complications, assessment findings, and management of diseases affecting the eyes, ears, nose, and throat.	1. Definitions, pathophysiology, epidemiology, mortality/morbidity, and complications 2. Specific assessment findings and symptoms 3. Specific management considerations 4. Conditions a. Eye i. Burn of eye and adnexa ii. Conjunctivitis iii. Corneal abrasions iv. Foreign body v. Inflammation of the eyelid 1. Chalazion 2. Hordeolum vi. Glaucoma vii. Hyphema viii. Iritis ix. Papilledema x. Retinal detachment and defect xi. Cellulitis of orbit b. Ear i. Foreign body ii. Impacted cerumen iii. Labyrinthitis

	iv. Meniere's disease v. Otitis external and media vi. Perforated tympanic membrane c. Nose i. Epistaxis ii. Foreign body iii. Rhinitis iv. Sinusitis d. Oropharynx/throat i. Dentalgia and dental abscess ii. Diseases of oral soft tissue (Ludwig's angina) iii. Foreign body iv. Epigottitis v. Laryngitis vi. Tracheitis vii. Oral candidiasis viii. Perionsillar absess ix. Pharyngitis/tonsillitis x. Temporomandibular joint disorders
10.15.5 – Consider Age-Related Variations in Pediatric and Geriatric Patients	
C 10.15.5.1 – Discuss differences in diseases affecting the eyes, ears, nose, and throat in pediatric patients.	1. Foreign bodies of ears and nose common 2. Ear infections common 3. Epiglottis more common in children
10.15.6 – Patient Education and Prevention	
C 10.15.6.1 – Discuss patient education and prevention of complications or future diseases of the eyes, ears, nose, or throat.	N/A

11.0 – Shock and Resuscitation

Integrates comprehensive knowledge of causes and pathophysiology into the management of cardiac arrest and peri-arrest states.

Integrates a comprehensive knowledge of the causes and pathophysiology into the management of shock, respiratory failure, or arrest with an emphasis on early intervention to prevent arrest.

11.1 – Shock and Resuscitation

Objective	Educational Standard
11.1.1 – Ethical Issues in Resuscitation	
C 11.1.1.1 – Discuss ethical issues in resuscitation.	1. Ethics foundation a. Patient autonomy i. Advance directives ii. Surrogate decision makers b. Principles of futility 2. Withholding resuscitation attempts a. Irreversible death b. Do not resuscitate orders 3. Withdrawing resuscitation – Termination of resuscitation efforts 4. Providing emotional support for family 5. Organ and tissue donation
11.1.2 – Pre-Morbid Conditions	
C 11.1.2.1 – Differentiate between the pre-morbid conditions of a healthy and unhealthy adult patient.	1. Healthy patient (adult) a. Coronary syndromes (conduction abnormalities, atherosclerosis) i. Modifiable risk factors ii. Non-modifiable risk factors b. Drowning c. Electrocution d. Electrolyte imbalance e. Hypothermia f. Toxic exposure g. Drug toxicity h. Pulmonary embolus 2. Unhealthy patient (adult) a. Congestive heart failure (“CHF”) b. Renal failure c. Uncontrolled hypertension d. Uncontrolled diabetes e. Obesity f. Electrolyte imbalance g. Drug toxicity h. Stroke (CVA)
11.1.3 – Anatomy and Physiology Review	
C 11.1.3.1 – Discuss the anatomy and physiology of the respiratory and	N/A

cardiovascular systems.	
11.1.4 – Physiology of Normal Blood Flow	
C 11.1.4.1 – Describe the physiology of normal blood flow through the body.	1. Generally speaking, the heart pumps blood out the left ventricle, around the circulatory system, and back to the right side of the heart 2. The negative intrathoracic pressure created by normal ventilation assists venous return a. With every breath, muscle contractions in the chest and diaphragm reduce the pressure within the lungs and chest cavity b. When the airway is open, air rushes from the higher-pressure zone outside the body into the low-pressure zone inside the chest c. The great vessels also enter the chest from above and below d. The same low pressure created within the chest during inspiration sucks blood into the cavity and right atrium
11.1.5 – Physiology of Blood Flow During CPR	
C 11.1.5.1 – Discuss the physiology of blood flow through the body during CPR, including heart pump theory, thoracic pump theory, and the impact of negative intrathoracic pressure.	1. Heart pump theory a. Heart is squeezed through direct compression between the sternum and the spinal column b. Pressure is increased within the chambers of the heart i. Blood flows from higher pressure chambers to lower pressured vessels and organs ii. Heart valves prevent retrograde flow 2. Thoracic pump theory a. Compression of the sternum during CPR i. Raises the pressure in the entire chest cavity ii. Pressure in the extrathoracic spaces remains low b. After establishing the pressure gradient i. Venous collapse prevents a backflow of blood ii. Open arteries allow forward flow out of the chest iii. Epinephrine (and other vasopressors) helps those arteries to remain open 3. Harder and faster compressions increase the pressure to a greater degree 4. Negative intrathoracic pressure a. Since patients in cardiac arrest are not breathing, they do not produce negative inspiratory pressure to assist the circulatory system b. During CPR, some negative pressure develops in the chest as the sternum and ribs rebound to their normal position during the decompression or relaxation phase

	i. When a greater amount of negative pressure can be achieved in the chest, a greater amount of blood will be returned to the heart ii. Then, with the next compression, a greater amount will be forced to the lungs and other vital organs c. If the chest is not allowed to fully recoil during CPR, venous return may be critically decreased
11.1.6 – Cardiac Arrest	
C 11.1.6.1 – Discuss the epidemiology and pathophysiology of cardiac arrest.	1. Epidemiology 2. Pathophysiology a. If the heart stops contracting, no blood will flow b. The body cannot survive when the heart stops i. Organ damage begins quickly after the heart stops ii. Brain damage 1. Begins four to six minutes after the patient suffers cardiac arrest 2. Becomes irreversible in eight to ten minutes. c. General reasons for the heart to stop beating i. Sudden death and heart disease ii. Breathing stops, especially in infants and children iii. Medical emergencies iv. Trauma
11.1.7 – Resuscitation	
C 11.1.7.1 – List system components to maximize survival for a patient suffering from a cardiac arrest.	1. Early access a. Public education and awareness i. Rapid recognition of a cardiac emergency ii. Rapid notification before CPR starts ("phone first") b. 911 pre-arrival instructions and dispatcher-directed CPR 2. Early CPR a. Lay public i. Family ii. Bystanders b. Emergency medical responders 3. Early defibrillation 4. Early advanced care
C 11.1.7.2 – Describe basic life support interventions (refer to current AHA guidelines).	1. Adult CPR and foreign body airway obstruction 2. Child CPR and foreign body airway obstruction 3. Infant CPR and foreign body airway obstruction 4. Neonatal sequence 5. Alternative CPR techniques (i.e., interposed abdominal compression)
C 11.1.7.3 – Describe airway control and	1. Airway adjuncts a. Basic adjuncts

ventilation interventions.	b. Advanced adjuncts (as defined by scope of practice) i. Role of advanced airways in resuscitation ii. Endotracheal intubation iii. Alternatives to endotracheal intubation 2. Ventilation a. Hazards of over-ventilation b. Devices to assist ventilation
C 11.1.7.4 – Discuss the delivery of effective chest compressions.	1. Factors that decrease effectiveness a. Compressions that are too shallow b. Slow compression rate c. Sub-maximum recoil d. Frequent interruptions 2. Devices to assist circulation a. Active compression-decompression CPR b. Impedance threshold device c. Mechanical piston device d. Load-distributing band or vest CPR
11.1.8 – Automated External Defibrillation (Refer to Current AHA Guidelines)	
C 11.1.8.1 – List the steps involved in administering automated external defibrillation to a patient suffering from a cardiac arrest (refer to current AHA guidelines).	1. Adult sequence 2. Child sequence 3. Infant sequence 4. Special situations a. Pacemaker/implanted cardioverter/defibrillator b. Wet victims c. Transdermal medication patches
11.1.9 – Advanced Life Support (Refer to Current AHA Guidelines)	
C 11.1.9.1 – Describe ALS electrical therapies used in the treatment of cardiac arrest.	1. Manual defibrillation 2. Synchronized cardioversion 3. Transcutaneous pacing
C 11.1.9.2 – Describe ALS intravenous access as pertinent to treating cardiac arrest.	N/A
C 11.1.9.3 – List arrest cardiac rhythms.	1. Ventricular fibrillation/pulseless ventricular tachycardia 2. Pulseless electrical activity 3. Asystole
C 11.1.9.4 – List non-arrest cardiac rhythms.	1. Bradycardia 2. Tachycardia
11.1.10 – Special Arrest and Peri-Arrest Situations (Refer to Current AHA Guidelines)	
C 11.1.10.1 – Discuss the epidemiology, pathophysiology, and management of patients with special arrest and peri-arrest situations (refer to current AHA guidelines).	1. Electrolyte abnormalities a. Epidemiology b. Pathophysiology c. Specific electrolytes i. Potassium ii. Sodium

	iii. Magnesium iv. Calcium d. Modifications to management 2. Toxic exposure a. Epidemiology b. Pathophysiology c. Specific problems i. Respiratory arrest ii. Bradycardia iii. Tachycardia iv. Hypertension v. Acute coronary syndrome vi. Impaired conduction vii. Shock viii. Cardiac arrest d. Modifications to management 3. Drowning a. Epidemiology b. Pathophysiology c. Modifications to management 4. Hypothermia a. Epidemiology b. Pathophysiology c. Modifications to management 5. Near-fatal asthma a. Epidemiology b. Pathophysiology c. Modifications to management 6. Anaphylaxis a. Epidemiology b. Pathophysiology c. Modifications to management 7. Traumatic cardiac arrest a. Epidemiology b. Pathophysiology c. Modifications to management 8. Cardiac arrest associated with pregnancy a. Epidemiology b. Pathophysiology c. Modifications to management 9. Electrical shock and lightning strikes a. Epidemiology b. Pathophysiology c. Modifications to management
11.1.11 – Postresuscitation Support (Refer to the Current AHA Guidelines)	
C 11.1.11.1 – Discuss postresuscitation support after the return of spontaneous circulation ("ROSC"). (Refer to current AHA guidelines.)	1. Temperature regulation (induced hypothermia) 2. Glucose control 3. Organ-specific support a. Respiratory system b. Cardiovascular system c. Central nervous system
11.1.12 – Shock	
C 11.1.12.1 – Define shock.	N/A

C 11.1.12.2 – Discuss anatomy and physiology as related to shock.	N/A
C 11.1.12.3 – Discuss the essential components for normal perfusion.	1. Functioning pump a. Stroke volume i. Preload ii. Afterload iii. Starling's law b. Cardiac output c. Blood pressure i. Mean arterial pressure ii. Pulse pressure d. Baroreceptors e. Nervous control of heart i. Sympathetic nervous system ii. Parasympathetic nervous system 2. Adequate volume a. Formed elements b. Plasma 3. Intact container/vessels a. Arteries b. Arterioles c. Capillary beds d. Sphincters e. Venules f. Veins g. Capacity of each vessel h. Sympathetic nervous system control of each vessel i. Blood flow controlled by cellular tissue demands j. Sphincter control
C 11.1.12.4 – Discuss tissue hypoperfusion.	1. Inadequate fluid volume 2. Inadequate pump 3. Inadequate container size
C 11.1.12.5 – Discuss the physiologic response to shock.	1. Cellular a. Fick principle b. Waste removal c. Aerobic metabolism/glycolosis d. Anaerobic metabolism 2. Cardiovascular system implications a. Preload b. Afterload c. Cardiac output d. Peripheral vascular resistance/systemic vascular resistance e. Blood pressure f. Mean arterial pressure g. Pulse pressures h. Starling's law i. Chemoreceptors j. Baroreceptors 3. Sympathetic nervous system and endocrine implications a. Epinephrine

	b. Norepinephrine 4. Kidneys a. Renin b. Angiotensin c. Aldosterone mechanism 5. Pituitary gland and hypothalamus a. Arginine aasopressin ("AVP") b. Adrenocorticotropic hormone cortisol system ("ACTH") c. Somatotropin 6. Pancreas a. Insulin b. Glucagon 7. Spleen 8. Osmosis
C 11.1.12.6 – Discuss the stages of shock.	1. Compensated shock 2. Decompensated shock 3. Irreversible shock
C 11.1.12.7 – Discuss specific types of shocks.	1. Hypovolemic a. Hemorrhage classifications i. Hemostasis ii. Vascular phase iii. Platelet phase iv. Coagulation phase v. Factors affecting clotting/coagulation b. Stages of hemorrhage i. Class I ii. Class II iii. Class III iv. Class IV 2. Distributive a. Neurogenic b. Anaphylactic c. Septic d. Psychogenic (vasovagal) 3. Cardiogenic a. Intrinsic causes i. Heart muscle damage 1. Physiology 2. Signs/symptoms 3. Assessment 4. Management ii. Dysrhythmia – Physiology iii. Myocardial insufficiency 1. Signs/symptoms 2. Assessment 3. Management iv. Valvular disruption 1. Physiology 2. Signs/symptoms 3. Assessment 4. Management b. Extrinsic causes i. Cardiac tamponade

	ii. Tension pneumothorax 4. Obstructive/mechanical a. Cardiac tamponade b. Tension pneumothorax c. Pulmonary emboli 5. Respiratory
C 11.1.12.8 – Discuss complications associated with shock.	1. Acute renal failure 2. Acute adult respiratory distress syndrome ("ARDS") 3. Hematologic failure 4. Hepatic failure 5. Multiple organ dysfunction syndrome ("MODS") a. Sepsis b. Acute respiratory distress syndrome ("ARDS") c. Death of organs d. Death of organism 6. Disseminated intravascular coagulation ("DIC")
C 11.1.12.9 – Discuss the assessment of a patient suffering from shock.	1. Scene size-up 2. Perform a primary assessment 3. Obtain a relevant history 4. Perform a secondary assessment 5. Perform a reassessment
C 11.1.12.10 – Discuss the management of a patient suffering from shock.	1. Manual in-line spinal stabilization, as needed 2. Comfort, calm, and reassure the patient 3. Do not give food or drink 4. Airway control 5. Breathing a. Assist ventilation, as needed b. Oxygen administration (high concentration) 6. Circulation a. Attempt to control obvious external bleeding b. Patient position c. Keep patient work (attempt to maintain normal body temperature) 7. Pneumatic anti-shock garment ("PASG") application 8. Fluid resuscitation a. Controllable external hemorrhage b. Uncontrollable external hemorrhage c. Internal hemorrhage 9. Consider medications, as needed 10. Begin transport at the earliest possible moment 11. Treat any additional injuries that might be present
C 11.1.12.11 – Identify devices to assist circulation in patients suffering from shock.	Impedance threshold device
C 11.1.12.12 – Identify differences between pediatric and geriatric patients suffering from shock.	1. Pediatrics a. Common causes of shock i. Trauma ii. Fluid loss iii. Neurological injury iv. Anaphylaxis v. Heart disease

vi. Chest wall injury
b. Presentation
i. Cardiovascular
ii. Skin signs
iii. Mental status
iv. Decreased fluid output
v. Vital signs
c. Anatomical and physiologic implications
i. Unreliable indicators
ii. Indicators of shock
1. Smaller absolute volume loss
2. Tachycardia for age
3. Weak distal pulses
4. Delayed capillary refill time
5. Cool mottled extremities
6. Altered mental status
d. Management
i. Inline spinal stabilization, as needed
ii. Suction, as needed
iii. High concentration oxygen
iv. Control bleeding
v. Positioning
vi. Maintain body temperature
vii. Fluid replacement
viii. Transport
2. Geriatrics
a. Assessment
i. Body system changes affecting presentation of shock
1. Nervous system
2. Cardiovascular
a. Difficulty tolerating hypotension from hemorrhage
b. Beta-blocker and calcium channel blockers can alter physiologic response to hemorrhage
3. Respiratory
4. Integumentary
5. Renal
6. Gastrointestinal
ii. Vital signs changes
1. Altered mental status
a. Sudden onset
b. Other causes
2. Hypoxia
iii. Airway
1. Decreased cough reflex
2. Cervical arthritis
3. Loose dentures
iv. Breathing
1. Higher resting respiratory rate
2. Lower tidal volume
3. Less elasticity/compliance of chest wall

v. Circulation
    1. Higher resting heart rate
    2. Irregular pulses
vi. Skin
    1. Dry, less elastic
    2. Cold
    3. Fever, not common
    4. Hot

b. Management
    i. Inline spinal stabilization
    ii. Suction, as needed
    iii. High flow oxygen
    iv. Control bleeding
    v. Positioning
    vi. Maintain body temperature

c. Transport

12.0 – Trauma

Integrates assessment findings with principles of epidemiology and pathophysiology to formulate a field impression to implement a comprehensive treatment/disposition plan for an acutely injured patient.

12.1 – Trauma Overview

Objective	Educational Standard
12.1.1 – Identification and Categorization of Trauma Patients	
C 12.1.1.1 – Discuss the identification and categorization of trauma patients as defined by the National Trauma Triage Protocol.	1. Centers for Disease Control and Prevention Guidelines for Field Triage of Injured Patients: Recommendations of the National Expert Panel on Field Triage. MMWR 2008:58 RR-1:1-35. 2. http://cdc.gov/fieldtriage contains the National Trauma Triage Protocols and additional instructional materials.
12.1.2 – Incidence/Significance of Trauma	
C 12.1.2.1 – Discuss the mortality, morbidity, and significance of trauma in the United States.	1. Mortality – Incidence of death 2. Morbidity – new cases where death is not an outcome (nonfatal injury) 3. Years of life lost (subtract age of death from life expectancy) 4. Deaths due to trauma in the United States a. All external causes of mortality b. Motor vehicle crashes c. Pedestrian d. Motorcycle e. Falls f. Mechanical forces (struck by object, machinery. g. Drowning h. Electrical current i. Intentional self-harm j. Assaults (firearms)
12.1.3 – Trauma System	
C 12.1.3.1 – Discuss the trauma system as it exists in Wisconsin.	1. Components (hospital categorizations) 2. Levels and qualifications 3. Transport considerations
12.1.4 – Types of Injury	
C 12.1.4.1 – List different types of traumatic injuries.	1. Blunt trauma a. Non-bleeding b. Multiple forces and conditions can cause blunt trauma 2. Penetrating trauma a. High velocity b. Medium velocity c. Low velocity

12.1.5 – Trauma Assessment	
C 12.1.5.1 – List the major components of the trauma patient assessment.	1. Standard precautions 2. Scene size-up 3. General impression 4. Mechanism of injury 5. Primary assessment 6. Baseline vital signs 7. History 8. Secondary assessment 9. Reassessment
C 12.1.5.2 – Differentiate between significant and non-significant mechanisms of injury ("MOI").	1. Significant MOI (including, but not limited to): a. Multiple body systems injured b. Vehicle crashes with intrusion c. Falls from heights d. Pedestrian versus vehicle collision e. Motorcycle crashes f. Death of an occupant in the same vehicle 2. Non-significant MOI a. Isolated trauma to a body part b. Falls without loss of consciousness (adult) c. Falls without loss of consciousness (pediatric) 3. Pediatric considerations a. Falls > 10 feet without loss of consciousness b. Falls < 10 feet with loss of consciousness c. Bicycle collision d. Medium to high-speed vehicle collision (>25 mph) 4. Reevaluating the MOI 5. Special considerations a. Spinal precautions must be initiated as soon as practical based on the MOI b. When practical, log roll the supine patient on their side to allow for an appropriate assessment of the posterior body
C 12.1.5.3 – Describe the primary assessment of a trauma patient.	1. Airway a. Clear airway (chin-lift, suction, finger sweep) b. Protect airway i. Decrease LOC, bleeding is ET without neck movement ii. Surgical airways 2. Breathing a. Assess ventilation capability b. Oxygenation (100%) c. Check thorax and neck i. Deviated trachea ii. Tension pneumothorax iii. Chest wounds and chest wall motion iv. Sucking chest wound v. Neck and chest crepitation vi. Multiple broken ribs vii. Fractured sternum d. Listen for breath sounds i. Re-check any ET tube placement

	ii. Hemopneumothorax 3. Circulation a. Apply pressure to sites of external exsanguinations b. Establish two large bore IVs i. Fluid bolus ii. Consider IO iii. Consider catheter site location c. Assess blood volume status d. Radial and carotid pulse locations, blood pressure determination e. Jugular venous filling f. Quality of heart tones 4. Beck's triad present? 5. Hypovolemia 6. Disability a. Brief neurological exam b. Pupil size and reactivity c. Limb movement d. Glasgow coma scale 7. Exposure a. Completely remove all clothes b. Logroll as part of inspection
C 12.1.5.4 – Describe the secondary assessment (head-to-toe physical examination) of a trauma patient.	1. Head/scalp – Symmetry 2. Face – Symmetry of facial muscles 3. Eyes – Pupil size, equality and reactivity to light, pink moist conjunctiva a. Adie's pupil b. Oculomotor never paralysis c. Horner's syndrome d. One eye blindness e. Deviations of the eye (paralytic strabismus) 4. Ears – Drainage, tympanic membrane rupture 5. Mouth – Foreign body, loose/broken teeth, blood, pink and moist mucosa 6. Nose – Drainage, singed nostrils, nasal flaring 7. Neck – Accessory muscle use, Tracheal deviation, jugular vein distention, medical jewelry, stoma, subcutaneous emphysema 8. Chest – Equal rise and fall, guarding, paradoxical movement, breath sounds, scars, heart sounds a. Pulse types i. Small, weak pulses ii. Large, bouding pulses iii. Bisferiens pulse iv. Pulsus alternans v. Bigeminal pulse vi. Paradoxical pulse b. Location of lung fields in the chest for auscultation c. Location of normal bronchovesicular and bronchial breath sounds in the chest and the meaning of abnormal locations d. Role of hyperresonance and tympany in percussion of the chest

	9. Abdomen – Guarding, rigidity, distention, scars, wounds 10. Pelvis/genital – Incontinence, stability 11. Arms, Distal circulation, sensation, motor function, medical jewelry 12. Legs – Distal circulation, sensation, motor function, medical jewelry 13. Back – Guarding, paradoxical movement, scars 14. Rapid method 15. Modified secondary assessment
P 12.1.5.5 – Manage trauma care.	1. Selective spinal immobilization 2. Spinal immobilization a. Assessment-based b. Cervical collar c. Long board d. Manual stabilization e. Seated patient (KED, short board, etc.) 3. Splinting a. Manual b. Pelvic Wrap / PASG c. Rigid d. Soft e. Traction f. Vacuum 4. Emergency moves for endangered patient 5. Rapid extrication
12.1.6 – Role of Documentation in Trauma	
C 12.1.6.1 – Discuss the role of documentation in caring for victims of trauma.	1. Topical anatomy 2. Scenario sections of patient care reports a. Mechanism of injury with specifics b. Response time c. Time on scene d. Initial findings e. Changes in assessment findings f. Care provided g. Important negative findings h. Recreate the scene i. Bystander care provided prior to arrival j. A complete report is essential and will be referred to by hospital personnel
12.1.7 – Trauma Scoring Scales	
C 12.1.7.1 – Discuss trauma scoring scales.	N/A
12.1.8 – Trauma Center Designations	
C 12.1.8.1 – Discuss trauma center designations.	N/A
12.1.9 – Transfer of Patients to the Most Appropriate Hospital	
C 12.1.9.1 – Discuss the transfer of trauma patients to the most appropriate hospital.	N/A

12.2 – Bleeding

Objective	Educational Standard
12.2.1 – Incidence	
C 12.2.1.1 – Discuss the mortality and morbidity affecting at-risk populations with traumatic bleeding.	1. Mortality and morbidity 2. Populations at risk
12.2.2 – Anatomy and Function	
C 12.2.2.1 – Discuss the anatomy and function of the respiratory, circulatory, and central nervous systems as they pertain to traumatic bleeding.	1. Respiratory system 2. Circulatory system 3. Central nervous system a. Autonomic nervous system b. Peripheral nervous system
12.2.3 – Pathophysiology	
C 12.2.3.1 – Discuss the pathophysiology of traumatic bleeding.	1. Review knowledge from previous levels 2. Centers around a. Failure to deliver nutrients to tissues b. Failure to excrete metabolic waste products c. Failure to excrete carbon dioxide
C 12.2.3.2 – Discuss organ involvement in shock due to traumatic bleeding.	1. Heart a. Four chambers functioning properly b. Autonomic innervation in balance c. Cardiac output and blood pressure homeostasis i. Cardiac output ii. Arterial blood pressure iii. Stroke volume 1. Preload 2. Afterload 3. Contractility 2. Blood vessels a. Arteries i. Role of autonomic nervous system ii. Arterial oxygen content b. Veins i. Role of capacitance ii. Role of precapillary sphincters c. Capillaries d. Balance of hydrostatic pressure and oncotic pressure 3. Blood a. Delivery of nutrients – Oxygen, glucose, proteins, fats, electrolytes i. Red blood cells ii. Plasma iii. Hematocrit iv. Hemoglobin v. Oxyhemoglobin dissociation curve vi. Leukocytes vii. Platelets b. Excretion of waste products c. Oxygen delivery i. Role of heart rate ii. Role of stroke volume

	iii. Role of hemoglobin concentration iv. Role of arterial oxygen saturation 4. Cellular metabolism a. Glycolysis b. Krebs cycle c. Electron transport
C 12.2.3.3 – Discuss the classifications of shock as related to traumatic bleeding.	1. Respiratory failure a. Obstruction – Airway, embolism b. Chest wall movement c. Diffusion failure (ARDS) d. Toxic exposures – Carbon monoxide, cyanide 2. Hypovolemic a. External b. Internal c. Third space losses – Fractures, thermal burns 3. Vascular failure a. Central nervous system loss b. Sepsis c. Anaphylaxis 4. Cardiac failure a. Intrinsic b. Extrinsic i. Cardiac tamponade ii. Tension pneumothorax
C 12.2.3.4 – Discuss compensatory shock as related to traumatic bleeding.	1. Respiratory compensation a. Baroreceptors b. Chemoreceptors 2. Sympathetic nervous system a. Alpha receptors b. Beta receptors c. Role of shunting 3. Neuroendocrine response a. ACTH b. Aldosterone c. Renin d. Vasopressin e. ADH 4. Fluid shifts in shock
C 12.2.3.5 – Discuss decompensated shock as related to traumatic bleeding.	1. Life effects a. Age b. Physical fitness c. Alcohol use d. Medications 2. Irreversible shock 3. Blood loss in shock a. 750 cc's in health people is well-tolerated (15%) b. Up to 30% or more is significant i. Tachycardia ii. Anxiety iii. Narrow pulse pressure c. Greater than 30% i. Hypotension

	ii. Pronounced tachycardia iii. Confusion d. More than 40%
C 12.2.3.6 – Discuss the complications of shock as related to traumatic bleeding.	1. Acute respiratory distress syndrome ("ARDS") a. Seen 24 to 48 hours after insult/injury b. Loss of alveolar and capillary wall integrity c. Treated with PEEP 2. Acute renal failure a. Damage to renal tubules b. Failure to excrete products of metabolism 3. Multiple organ failure syndrome ("MOFS")
12.2.4 – Assessment Consideration in Shock	
C 12.2.4.1 – Discuss assessment considerations for a patient in shock due to traumatic bleeding.	1. Review knowledge from previous levels 2. Scene size-up a. Assure personal safety i. Hazard awareness ii. Traffic safety iii. Ambulance placement strategy iv. Mood of bystanders v. Vehicle stability b. Number of patients present c. Significant MOI (including, but not limited to): i. Multi-systems trauma ii. Ejection from vehicle iii. Fall > 20 feet without loss of consciousness iv. Fall < 20 feel with loss of consciousness v. Vehicle roll-over vi. High-speed vehicle collision vii. Vehicle vs. pedestrian collision viii. Motorcycle collision ix. Significant external blood loss (> 1,000 cc) x. Penetrations of the head, chest, abdomen, or pelvis xi. Unresponsive or altered mental status with suspected traumatic origin xii. Death or major injury of another occupant in same vehicle d. Crime scene considerations e. Scene time considerations (not to exceed 10 minutes) f. Airway i. Foreign body obstruction ii. Airway integrity 1. Structural damage 2. Edema 3. Airway movement over trachea g. Ventilation i. Breathing patterns 1. Tracheal tugging 2. Diaphragmatic movement

	3. Cheyne-stokes 4. CNS involvement ii. Chest 1. Wall integrity 2. Breath sound assessment iii. Jugular vein assessment h. Circulation i. Cardiac output assessment 1. Presence of pulse 2. Location of pulse (estimation to blood pressure) ii. Skin color and temperature – Color 1. Role of vasoconstriction and color 2. Role of hypovolemia versus circulatory status iii. Hemorrhage 1. Rapid detection and control of external hemorrhage a. Role of patient position b. Role of lighting (night) c. Patient movement after insult 2. Internal causes a. MOI b. Restlessness c. Chest considerations d. Abdominal considerations e. Extremity consideration iv. Other causes of shock 1. Vascular resistance 2. Pump failure i. Vital signs i. Respiratory rate considerations ii. Pulse rate considerations iii. Blood pressure considerations j. Disability – Rapid neurological considerations i. Alert ii. Stimuli iii. Unresponsive iv. Posturing 1. Decorticate 2. Decerebrate v. Pupil assessment considerations vi. Pulse, sensory, and motor considerations
12.2.5 – Shock Management Strategies and Considerations	
C 12.2.5.1 – Discuss shock management strategies and considerations for a patient with traumatic bleeding.	1. Scene safety 2. Body substance isolation precautions 3. Restore tissue oxygenation a. Airway – Open throughout care i. Manual maneuvers (in-line considerations) ii. Unconscious patient airway considerations

iii. Definitive airway considerations
b. Ventilation – Adequate minute volume
i. Hyperventilation contraindicated
ii. Monitor via oxygenation level
c. Oxygenation
i. Maintain SaO_2 between 90% and 92%
ii. Small drops in SaO_2 below 90% shift oxyhemoglobin curve dramatically
iii. Unable to maintain 90%+, investigate cause (tension pneumothorax)

4. Field impression of cause
a. Assess mechanism of injury/illness
b. Complete rapid patient assessment
i. Immobilization techniques
ii. Exposure of patient
c. Determine cause of shock
i. Use proper treatment plan based upon cause
1. Hypovolemic (bleeding, burns, dehydration)
2. Respiratory failure
3. Cardiac failure
ii. Vascular failure (anaphylaxis)

5. Transport decision – Based upon cause of shock
a. Cause of shock rarely definitively treated in the field
b. Specialty centers
i. Trauma
ii. Burns
iii. Cardiac
iv. Stroke

6. Improve stroke volume
a. Control external hemorrhage
b. Improve preload (intravenous therapy)
i. 20 – 30 mL / Kg
ii. Fluid bolus
iii. Large bore, short length catheter
iv. Monitor patient response to therapy
v. Do not overhydrate patients
1. Hemodilution
2. Platelet aggulation
vi. Fluid choice
1. Types of fluids (refer to American College of Surgeons guidelines)
a. Advantages
b. Disadvantages
c. Role of hydrostatic pressure
d. Role of colloid oncotic pressure
2. Blood substitute products
3. Blood administration in the field
c. Afterload considerations (systemic vascular resistance)
d. Temperature considerations
i. External environmental considerations (blankets)

	ii. Internal considerations
12.2.6 – Bleeding Considerations	
C 12.2.6.1 – Discuss the pathophysiology, assessment findings, and management considerations for a patient with traumatic bleeding.	1. Physiology and pathophysiology a. Review knowledge from previous levels b. Products and characteristics of blood c. Blood clotting d. Arterial bleeding e. Venous bleeding f. Location of bleeding i. Eternal ii. Internal 1. Head 2. Chest 3. Abdomen 4. Extremities 2. Assessment of bleeding 3. Management considerations in bleeding 4. Review knowledge from previous levels

12.3 – Chest Trauma

Objective	Educational Standard
12.3.1 – Incidence of Chest Trauma	
C 12.3.1.1 – Describe the morbidity and mortality of chest trauma, including prevention strategies.	1. Morbidity/mortality 2. Prevention strategies
12.3.2 – Traumatic Aortic Disruption	
C 12.3.2.1 – Discuss the pathophysiology, assessment considerations, and management of a patient with a traumatic aortic disruption.	1. Pathophysiology a. Review of knowledge from previous levels b. Role of deceleration and speed as MOI i. Events regarding the ligamentum arteriosum ii. Rupture of descending aorta at the isthmus c. Partial tear i. Bleeding in the left chest ii. Role of tunica intima and tunica advenitia in prevention of complete tear iii. Expanding hematoma may compress esophagus or laryngeal nerve d. Complete tear – Fatality likely on arrival 2. Specific assessment considerations a. Review knowledge from previous levels b. Mechanism of injury i. High index of suspicion necessary for survival ii. Rapid deceleration c. High percent have no signs of external chest trauma d. Hypotension e. Signs of shock f. Chest pain (tearing in nature) g. Suspicion raises with chest wall injury h. Unusual pulses or blood pressure in upper extremities i. Voice changes i. Hoarseness ii. Stridor j. Difficulty swallowing 3. Management considerations a. Review knowledge from previous levels b. AVO management c. High index of suspicion based upon MOI d. Do not overhydrate e. Do not use pressor agents
12.3.3 – Pulmonary Contusions	
C 12.3.3.1 – Discuss the pathophysiology, assessment considerations, and management of a patient with a pulmonary contusion.	1. Pathophysiology a. Review knowledge from previous levels b. Blunt trauma with associated injuries (rib fractures) c. Capillary leakage into alveoli prevents gas exchange d. Decrease lung compliance

	e. V/Q mismatch f. Slowly developing process g. Diffuse versus localized 2. Assessment considerations a. Review knowledge from previous levels b. Respiratory distress symptoms c. Hemoptysis d. Chest pain from blunt trauma e. Cough f. Rales or rhonchi g. Hypoxia h. High index of suspicion based on MOI 3. Management considerations a. Review knowledge from previous levels b. AVO c. IV fluid administration (over hydration is contraindicated; see Trauma: Bleeding)
12.3.4 – Blunt Cardiac Injury	
C 12.3.4.1 – Discuss the pathophysiology, assessment considerations, and management of a patient with a blunt cardiac injury.	1. Pathophysiology a. Review knowledge from previous levels b. May not have histological findings (heart is "stunned") c. Cardiac arrhythmias occur d. Heart failure may occur i. Review of right-sided heart failure ii. Review of left-sided heart failure 2. Assessment considerations a. Review knowledge from previous levels b. High index of suspicion with anterior blunt chest trauma c. Clinical signs vary due to injury location in heart (vessels, muscle mass, or conduction system) d. Tachycardia e. May not exhibit external chest discoloration f. Chest pain (retrosternal, MI type pain) 3. Management considerations a. Review knowledge from previous levels b. High index of suspicion c. AVO d. Limit fluids if signs of heart failure are present i. Lung crackles ii. Jugular venous distension e. Be prepared for deteriorations in patients with rapid or irregular pulses
12.3.5 – Hemothorax	
C 12.3.5.1 – Discuss the pathophysiology, assessment considerations, and management of a patient with a hemothorax.	1. Pathophysiology a. Review knowledge from previous levels b. Tears in lung parenchyma c. Penetrating wounds (puncture great vessels or heart) d. Intercostal vessel wounds e. Internal mammary artery wounds

	f. Clotting in the chest may release fibrolysins (continue bleeding process) g. Loss of circulating blood in vessels 2. Specific assessment considerations a. Review knowledge from previous levels b. Shock c. Unequal breath sounds d. Dullness on percussion e. JVD assessment i. Flat with hypovolemia ii. Distended if increased intrathoracic pressure 3. Specific management considerations a. Review knowledge from previous levels b. AVO c. Fluid bolus and continued hypovolemia assessment (see Trauma: Bleeding) d. Rapid transport to appropriate facility
12.3.6 – Pneumothorax	
C 12.3.6.1 – Discuss the pathophysiology, assessment considerations, and management of a patient with an open, simple, or tension pneumothorax.	1. Open a. Pathophysiology i. Review knowledge from previous levels ii. Open wound to the chest wall iii. Underlying organ and vessel injuries iv. Fracture of chest wall structure v. Hypoxia vi. Loss of lung adhesion to chest wall due to lass of surface tension, collapse of lung b. Specific assessment considerations i. Review knowledge from previous levels ii. AVO assessment iii. Chest assessment 1. Inspection 2. Auscultation 3. Percussion iv. Subcutaneous emphysema v. Hypovolemia signs vi. Pulsus paradoxus vii. Cardiac dysrhythmia 1. May be irregular pulse 2. May be ventricular tachycardia/v-fib in pulseless patient c. Specific management considerations for penetrating chest trauma i. Review knowledge from previous levels ii. Management may vary depending upon organs injured in the chest iii. Airway iv. Ventilation 1. Inspect chest 2. Excessive pressure ventilation can cause tension pneumothorax v. Oxygenation

vi. Pneumothorax complications
vii. Dysrhythmia treatment

2. Simple
   a. Pathophysiology
      i. Review knowledge from previous levels
      ii. Defect in chest wall allows air to enter plural space
      iii. Most common from gunshot wound
      iv. Some low velocity wounds self-seal (not allow atmospheric air into the chest, but air from inspiration in the chest can occur in the same patient)
      v. If chest wall hole is 2/3rd the size of the trachea, more air will enter from the atmosphere (sucking sound will be present)
      vi. With large holes, air enters both the trachea and the hole, rapidly collapsing the lung
      vii. Delayed or improper treatment will lead to tension pneumothorax with large open wounds
   b. Specific assessment considerations
      i. Review knowledge from previous levels
      ii. Airway
      iii. Ventilation
         1. Cover large (2/3rd size of trachea) open wound immediately (nonporous dressing)
         2. Positive pressure ventilation will aggravate condition
      iv. Oxygenation
      v. Unequal breath sounds
   c. Specific management considerations
      i. Review knowledge from previous levels
      ii. Small simple pneumothorax is well tolerated in young and fit individuals
      iii. Consider removing dressing if signs and symptoms of tension pneumothorax develop (may need to open the wound)
3. Tension
   a. Pathophysiology
      i. Review knowledge or previous levels
      ii. Formation of one-way valve (air from either lungs or atmosphere)
      iii. Increased pleural pressure (shift of mediastinal structures to contralateral side; causes kinking of great veins, decreasing cardiac ouput)
      iv. May be closed (untreated rupture of alveolar sac)
      v. May be open (penetrating trauma; injury to bronchus or bronchi)
   b. Specific assessment considerations
      i. Review knowledge from previous levels

	ii. Severe respiratory distress iii. Jugular vein distention iv. Deviation of the trachea (difficult to assess) v. Tachycardia vi. Narrow pulse pressure vii. Absent breath sounds on affected side viii. Unequal chest rise ix. Pulsus paradoxus c. Specific management considerations i. Review knowledge of previous levels ii. Fluid infusion may not affect blood pressure and pulse due to great vessel compression
12.3.7 – Cardiac Tamponade	
C 12.3.7.1 – Discuss the pathophysiology, assessment considerations, and management of a patient with a cardiac tamponade.	1. Pathophysiology a. Review knowledge form previous levels i. Penetrating trauma (rare in blunt) ii. Right ventricle most penetrated b. Blood in pericardial sac i. Perforation of heart muscle ii. Amount of blood dependent in where blood originates 1. Left ventricle 2. Coronary artery 3. Venous blood c. Knife wounds more frequently cause d. Pericardial laceration seals and hemorrhage fills the sac e. Sac is not elastic (no stretching) f. Small amounts (55 cc) can cause reduction in cardiac output g. Increased sac pressure puts pressure on coronary arteries 2. Specific assessment considerations a. Review knowledge from previous levels i. Jugular vein distention (increase in CVP) ii. Increased diastolic pressure iii. Narrowed pulse pressure b. Beck's triad i. Increased venous pressure (JVD) ii. Decreased blood pressure (hypotension) iii. Muffled heart tones (unreliable) 3. Specific management considerations in cardiac tamponade a. Review knowledge from previous levels b. AVO c. Rapid IV fluid bolus d. Rapid transport for pericardiocentesis
12.3.8 – Rib Fractures	
C 12.3.8.1 – Discuss the pathophysiology, assessment considerations, and management of a patient with rib fractures.	1. Pathophysiology 2. Assessment 3. Management

12.3.9 – Flail Chest	
C 12.3.9.1 – Discuss the pathophysiology, assessment considerations, and management of a patient with a flail chest.	1. Pathophysiology 2. Assessment 3. Management
12.3.10 – Commotio Cordis	
C 12.3.10.1 – Discuss the pathophysiology, assessment considerations, and management of a patient with commotio cordis.	1. Pathophysiology 2. Assessment 3. Management
12.3.11 – Tracheobronchial Disruption	
C 12.3.11.1 – Discuss the pathophysiology, assessment considerations, and management of a patient with tracheobronchial disruption.	1. Pathophysiology 2. Assessment 3. Management
12.3.12 – Diaphragmatic Rupture	
C 12.3.12.1 – Discuss the pathophysiology, assessment considerations, and management of a patient with a diaphragmatic rupture.	1. Pathophysiology 2. Assessment 3. Management
12.3.13 – Traumatic Asphyxia	
C 12.3.13.1 – Discuss the pathophysiology, assessment considerations, and management of a patient with traumatic asphyxia.	1. Pathophysiology 2. Assessment 3. Management
12.3.14 – Pediatric Considerations in Chest Trauma	
C 12.3.14.1 – Discuss pediatric considerations as they pertain to the management of non-adult patients with chest trauma.	1. Review of anatomical differences 2. Review of physiological differences 3. Review of differences in mechanism of injury 4. Specific management considerations a. Airway management (see AVO: Pediatric considerations) b. Fluid replacement (see Trauma: Bleeding: Pediatric considerations, respiratory distress symptoms) c. Hemoptysis d. Chest pain from blunt trauma e. Cough f. Rales or rhonchi g. Hypoxia h. High index of suspicion based on MOI 5. Management considerations a. Review knowledge from previous levels b. AVO i. PEEP is best ii. Ventilator support in later stages c. Intubation if indicated d. Proper IV fluid administration (over-hydration is contraindicated)
12.3.15 – Geriatric Considerations in Chest Trauma	
C 12.3.15.1 – Discuss geriatric considerations pertaining to the treatment of geriatric patients with chest trauma.	N/A

12.4 – Abdominal and Genitourinary Trauma

Objective	Educational Standard
12.4.1 – Incidence	
C 12.4.1.1 – Describe the morbidity and mortality of abdominal and genitourinary trauma, including prevention strategies.	1. Morbidity/mortality 2. Prevention strategies
12.4.2 – Vascular Injury	
C 12.4.2.1 – Discuss the pathophysiology, assessment considerations, and management of a patient with vascular injury.	1. Pathophysiology a. Review knowledge from previous levels b. Injuries may be blunt or penetrating c. Structures i. Abdominal aorta ii. Mesenterics (superior and inferior) iii. Renal artery iv. Gonadal arteries v. Gastic artery vi. Splenic artery vii. Hepatic artery viii. Illiac arteries ix. Hepatic portal system x. Inferior venae cavae d. Internal bleeding (related to which and how many blood vessels injured) e. Potential bleeding space in the abdomen f. Length of time from injury to surgery g. Often masked by other injuries h. Internal venous bleeding may be more severe because arterial bleeds can occlude the lumen of the artery 2. Special assessment findings a. Review knowledge from previous levels b. High level of suspicion with MOI c. Solid organs injured with blunt trauma (liver, spleen) d. Patient history of the injury pattern/cause e. Seat belts (proper use of, in rapid deceleration) f. Entrance and exit wounds g. Abdominal tenders in four quadrants h. Lower rib tenderness i. Guarding j. Presence of lower pulses k. Kehr's sign l. Use of ultrasound 3. Special management considerations a. Review knowledge from previous levels b. AVO c. Hypotension treatment (fluid bolus) d. Recognition of injury (others may mask) e. Rapid transport f. Use of PASG g. Do not hemodilute patients (disrupts clot formation)

12.4.3 – Solid and Hollow Organ Injuries

C 12.4.3.1 – Discuss the pathophysiology, assessment considerations, and management of a patient with solid and/or hollow organ injuries.

1. Pathophysiology
   a. Review knowledge from previous levels
   b. Solid organs
      i. Liver
         1. Review functions of the liver
         2. Difficult to control hemorrhage in surgery
         3. Require massive blood transfusions in surgery
      ii. Spleen
         1. Largest lymphoid organ in body
         2. Review functions of the spleen
         3. Blood cell reservoir
      iii. Kidney
         1. Review functions of kidney
         2. Classification or renal injury
      iv. Abdominal vessels
      v. Pancreas
   c. Hollow organs
      i. Stomach
      ii. Small bowel
      iii. Large bowel
      iv. Urinary bladder
      v. Gallbladder
         1. Review path of fluids in hollow organs
         2. Review presence of bacteria in hollow organs
   d. Review co-morbidity of abdominal diseases and abdominal trauma
2. Special assessment findings
   a. Review knowledge from previous levels
   b. Findings relate to:
      i. Solid versus hollow organ
      ii. Comorbid injuries that may mask
      iii. Time since injury
      iv. Vascularity of organ
      v. Blunt versus penetrating trauma
      vi. How the organ is or is not attached to the abdominal wall
      vii. Size of the insult
   c. Splenic and liver injuries have classifications
   d. Patient history surrounding MOI is important
   e. Inspection of the abdomen is critical
   f. Stability of the pelvis
   g. Seat belt use and fit across abdomen
   h. Kehr's sign
   i. Abdominal tenderness
3. Special management considerations
   a. Review knowledge from previous levels
   b. AVO
   c. Circulation

	d. High index of suspicion e. Rapid transport f. Role of ultrasound g. Changes with repeated assessments
12.4.4 – Blunt versus Penetrating Abdominal Injury	
C 12.4.4.1 – Discuss the pathophysiology, assessment considerations, and management of a patient with a blunt or penetrating injury.	1. Pathophysiology a. Review knowledge from previous levels b. Hole in abdominal wall c. Underlying solid and hollow organs is major concern d. Route for infection e. Cavitation f. Abdominal wall bleeding 2. Special assessment findings a. Review knowledge from previous levels b. Most patients with penetrating abdominal injury have underlying solid and hollow organ injuries (cover elsewhere) c. Inspection i. Entrance and exit wounds ii. Lacerations iii. Discoloration of skin iv. Distention d. Palpation i. Accomplished by quadrant (start furthest away from injury) ii. Blood will not cause immediate peritonitis iii. Chemical peritonitis may be abrupt from stomach acids iv. Bacterial peritonitis may take hours to develop e. Patient affect i. Quiet, non-complaining patients may have severe injuries ii. Lots of patient movement indicates less chance for peritonitis iii. Hypovolemia changes LOC f. Referred pain to shoulder g. Large amounts of intra-abdominal bleeding may occur without much external evidence h. Field ultrasound i. Hematuria j. Grey-turner's sign (flank discoloration) k. Rectal bleeding 3. Special management considerations a. Review knowledge from previous levels b. AVO c. Circulation d. Cover exposed bowel with sterile saline dressings e. Field ultrasound
12.4.5 – Evisceration	

C 12.4.5.1 – Discuss the pathophysiology, assessment considerations, and management of a patient with an evisceration.	1. Pathophysiology a. Review knowledge from previous levels b. Open injury to abdominal wall, which allows protrusion of abdominal contents c. Strangulation of bowel by abdominal wall d. Loss of fluid and temperature regulation of exposed bowel 2. Special assessment findings a. Review knowledge from previous levels b. Exposed bowel (may be large or small) c. Bowel protrudes with increase in abdominal Pressure (cough) d. Maybe recent post-surgical patient at home (cough, straining) 3. Special management considerations a. Review knowledge from previous levels b. AVO c. Circulation d. Pain relief considerations e. Cover bowel with sterile saline gauze f. Patient may find relief with knee bent g. Avoid coughing
12.4.6 – Retroperitoneal Injury	
C 12.4.6.1 – Discuss the pathophysiology, assessment considerations, and management of a patient with a retroperitoneal injury.	1. Pathophysiology 2. Special assessment findings 3. Special management considerations
12.4.7 – Injuries to External Genitalia	
C 12.4.7.1 – Discuss the pathophysiology, assessment considerations, and management of a patient with an injury to the external genitalia.	1. Pathophysiology a. Male i. Scrotum 1. Holds large volumes of blood or fluids 2. Blunt, penetrating, or crushing injury ii. Penis 1. Blunt, penetrating, or crushing injury 2. Amputation 3. Urethra penetration b. Female 2. Special assessment findings a. Male external genitalia i. Pain ii. Swelling b. Female i. Pain ii. Bleeding iii. Clues of sexual assault iv. History of foreign object penetration c. Review knowledge from previous levels 3. Special management considerations a. Review knowledge from previous levels b. Male i. Treat amputations as with other

	amputations ii. Do not relieve pressure in scrotum iii. Do not remove impaled objects iv. Provide pain management v. Ice to reduce swelling vi. Emotional support c. Female i. Control external hemorrhage ii. Emotional considerations in assault/rape iii. Do not remove impaled objects iv. Reporting requirements with assault v. Review sexual assault at lower levels
12.4.8 – Age-Related Variations	
C 12.4.8.1 – Identify differences between pediatric and geriatric patients suffering from abdominal and genitourinary trauma.	1. Pediatrics 2. Geriatrics

12.5 – Orthopedic Trauma

Objective	Educational Standard
12.5.1 – Incidence	
C 12.5.1.1 – Describe the morbidity and mortality of orthopedic trauma, including prevention strategies.	1. Morbidity/mortality a. Upper extremity b. Lower extremity 2. Prevention
12.5.2 – Pediatric Fractures	
C 12.5.2.1 – Discuss the pathophysiology, assessment considerations, and management of pediatric fractures.	1. Pathophysiology a. Review previous knowledge b. Types of fractures i. Epiphyseal (at bone growth plate) ii. Greenstick (incomplete fracture from bending bone) iii. Torus (buckling of cortex of bone) c. Immature growth of bones d. Growth plates at end of bones and complications of epiphyseal fractures 2. Special assessment findings a. Review previous knowledge b. MOI (assess for abuse) c. Motor, sensory, pulse assessment distal to injury d. Child/parent interaction e. Age differences and reaction to trauma f. Assess for comorbidity 3. Special management considerations a. Review previous knowledge b. AVO c. Transport with family members d. Consent issues when family not present, injury not serious e. Inform family, teachers, guardians of transport location f. Immobilization the same as adults g. Ice will reduce swelling
12.5.3 – Tendon Lacerations / Transection / Rupture (Achilles and Patellar)	
C 12.5.3.1 – Discuss the pathophysiology, assessment considerations, and management of tendon lacerations, transections or ruptures (Achilles and patellar).	1. Pathophysiology a. Review previous knowledge b. Physiology of tendons c. Achilles tendon rupture d. Patellar (knee) i. Twisting of the knee in sports activities ii. Anterior cruciate ligament iii. Posterior cruciate ligament iv. Lateral collateral ligament v. Medial collateral ligament vi. Compression injury (direct blow to knee) vii. Lateral and medial sprains (abnormal

	twisting) viii. Torsion injuries (feet fixed in one direction while body is moving in different direction) ix. Hyperextension (knee extended beyond normal straight leg position) e. Shoulder i. Sternoclavicular sprain (direct blow or twisting of posteriorly extended arm) ii. Rotator cuff tendon injuries (acute or chronic; deltoid muscle involvement; violent pull on arm, an abnormal rotation, or fall on outstretched arm that tears or ruptures tendons) 2. Special assessment findings a. Review previous knowledge b. Muscle weakness c. Pain d. Edema e. Loss of range of motion 3. Special management considerations a. Review previous knowledge b. Ice c. Elevation d. Sensory, motor function e. Inspection f. Palpation (symmetry with other limbs) g. Tests to determine if mobility is normal or abnormal h. Assess as soon after injury as possible i. Psychological support j. Immobilization, if necessary k. Support of other allied health professions (athletic trainers)
12.5.4 – Open Fractures	
C 12.5.4.1 – Discuss the pathophysiology, assessment considerations, and management of open fractures.	1. Pathophysiology a. Review previous knowledge b. Bone disruption with opening in the skin c. Role of osteoblasts d. Method of fracture healing i. Bleeding at site ii. Hematoma forms fibrous network iii. Invasion of osteoblasts iv. Callus formation (new bone built up, dead bone removed) v. Remodeling e. Osteomyelitis f. Fat embolism 2. Special assessment findings a. Review previous knowledge b. Open wounds over any injured bone c. Bone involvement (does not have to be sticking out to be open) d. Motor, sensory, distal pulse/circulation

	evaluation 3. Special management considerations a. Review previous knowledge b. Control bleeding i. External ii. Internal c. Prevent infection d. Immobilization techniques i. Traction control hemorrhage by applying pressure on internal bleeding within muscles wrapped by muscle sheaths ii. Align in anatomical position e. Comorbidity (multi-system trauma)
12.5.5 – Closed Fractures	
C 12.5.5.1 – Discuss the pathophysiology, assessment considerations, and management of closed fractures.	1. Pathophysiology a. Review previous knowledge b. Closed fractures contribute to internal vascular or newer injuries c. Muscle spasms surrounding fracture cause bone ends to rub d. Fat embolism 2. Special assessment findings a. Review previous knowledge b. Edema c. Pain d. Motor, sensory, distal circulation e. Isolated fracture (focus assessment and management) f. Comorbidity with multi-system trauma 3. Special management considerations a. Review previous knowledge b. Immobilization techniques – Unique depending on bone fractured
12.5.6 – Dislocations	
C 12.5.6.1 – Discuss the pathophysiology, assessment considerations, and management of dislocations.	1. Pathophysiology a. Review previous knowledge b. Joint involvement i. Elbow (fall on outstretched arm, radius, and ulna forced backward) ii. Fingers (hit on fingers, forced upward away from palm) iii. Hip (force along long axis of femur) 1. Posterior (femur shaft is adducted and flexed [more common of the two]) 2. Anterior (flexed, adducted, and internally rotated) iv. Humerous head (forced out of articular capsule, fall with inward rotation and abduction of an arm) v. Knee (foot planted, outward displacement with patella stable in place)

	vi. Shoulder joint (maintained in place by ligaments, impact drives acromion downward away from clavicle, which sustains its position) vii. Wrist (wrist is in a hyperextended position) c. Joint moved beyond its normal limits d. Subluxations (partial dislocation) e. Luxations (complete dislocation) 2. Special assessment findings a. Loss of limb function b. Deformity (almost always present) c. Immediate swelling and point tenderness d. Review previous knowledge 3. Special management considerations a. Review previous knowledge b. Figure-eight splinting for shoulders (sternoclavicular joint) c. Sling and swath for acromiclavicular joint d. Elbow splinted in position found if distal circulation present e. Wrist (padded board or pillow splint with sling and swath) f. Hip (position found with blankets or pillows for comfort) g. Knee (true emergency; position found unless distal circulation compromised, then anatomical alignment) h. Ice to reduce swelling i. Elevation j. Pain relief
12.5.7 – Compartment Syndrome	
C 12.5.7.1 – Discuss the pathophysiology, assessment considerations, and management of compartment syndrome.	1. Pathophysiology a. Review previous knowledge b. Locally increased pressure compromises local circulation and neuromuscular function c. Occur with crush injuries d. Burns e. Tight casts a part of fracture management f. Occlusion of arterial blood supply g. Snake bites h. Rhabdomyolysis 2. Special assessment findings a. Review previous knowledge b. Severe limb pain c. Muscle compartment extremely tight d. Decreased sensation to touch e. Parathesia f. Loss of distal circulation g. Paralysis 3. Special management considerations a. Review previous knowledge b. Removal of plaster casts c. Elevation

	d. Ice e. Rapid transport to appropriate facility f. Treatment of academia g. Treatment of rhabdomyolysis h. Pain management

12.6 – Soft Tissue Trauma

Objective	Educational Standard
12.6.1 – Incidence of Soft Tissue Injury	
C 12.6.1.1 – Describe the morbidity and mortality of soft tissue trauma.	N/A
12.6.2 – Anatomy and Physiology of Soft Tissue Injury	
C 12.6.2.1 – Discuss the anatomy and physiology of soft tissue injury.	1. Layers of the skin 2. Function of the skin
12.6.3 – Pathophysiology of Wound Healing	
C 12.6.3.1 – Discuss the pathophysiology of wound healing.	1. Hemostasis 2. Inflammation phase 3. Epithelialization 4. Neovascularization 5. Collagen synthesis 6. Alteration of wound healing a. Anatomic factors b. Concurrent drug use c. Medical conditions/disease d. High risk wounds 7. Abnormal scar formation a. Keloid b. Hypertropic scar formation c. Wounds requiring closure i. Cosmetic regions ii. Gaping wounds iii. Wounds over tension lines/areas 1. Static tension 2. Dynamic tension iv. Degloving injury v. Ring injury vi. Skin tearing
12.6.4 – Wounds	
C 12.6.4.1 - Discuss the pathophysiology, assessment considerations, and management of avulsions.	1. Pathophysiology a. Description (shearing force causes tissue to completely separated from base, and either lost or left with a flap) b. Depth influences amount of bleeding c. Secondary infection d. Wound healing process e. Scar tissue and its function/ability 2. Special assessment finding a. Lost soft tissue b. Skin “flap,” which can be returned to anatomical position c. Contaminated wounds d. Serosanguineous drainage 3. Special management considerations a. Control hemorrhage b. Ice to area c. Wound cleaning techniques

	d. Long term care versus emergent care
C 12.6.4.2 – Discuss the pathophysiology, assessment considerations, and management of bite wounds.	1. Pathophysiology – Types a. Animal i. Dog may cause any kind of soft tissue injury ii. Elderly and young most susceptible to infection iii. Cat bites, more infectious (pasteurella multocida) b. Human i. May cause any kind of soft tissue wound ii. Most frequently the hand iii. Secondary infection due to delay in treatment iv. Multiple types of bacteria may cause the infection c. Insect i. Spider bites 1. Black widow 2. Brown recluse ii. Fire ants iii. Wasps iv. Bees v. Tick bites vi. Scorpion stings d. Rabies 2. Special assessment findings a. Animal i. Note time since bite ii. Type of animal b. Human i. Cause of wound ii. Location iii. Presence of infection due to delay in seeking treatment c. Insect i. Black widow ii. Brown recluse iii. Fire ants iv. Tick bites 1. Woods, parks (know the area where bites occur) 2. Look for tick attached to the skin 3. Febrile illness present 4. Bulls-eye rash seen with Lyme disease 5. Rocky Mountain spotted fever 6. Know tick bite prevention strategies 3. Special management considerations a. Animal i. Scene safety (assure animal secured) ii. Control hemorrhage iii. Clean wound iv. Report type of animal bite b. Human

	i. Cause of bite ii. Abuse, neglect, and reporting responsibilities c. Insect i. Spider bites ii. Fire ants 1. Remove victim and crew from ant mounds 2. Brush off ants 3. Supportive care iii. Tick bites 1. Inspect for ticks when suspicious 2. Pull tick straight out of skin with tweezers 3. Do not crush the tick when removing 4. Likely needs specialized hospital care if severely ill 5. Supportive care
C 12.6.4.3 – Discuss the pathophysiology, assessment considerations, and management of lacerations.	1. Pathophysiology a. Tears in the skin b. Multiple causes c. Bleeding affected by location, type of blood vessels injured d. Underlying soft tissue involvement (tendons, ligaments) e. Underlying organ involvement (bones, body cavities, organs) f. Review bleeding and shock 2. Special assessment findings a. Review previous knowledge b. Consider the location on the body and tissues injured c. Consider loss of function of the tissue d. Consider role of infection for delayed treatment 3. Special management considerations a. Review previous knowledge b. Review hemorrhage control procedures
C 12.6.4.4 – Discuss the pathophysiology, assessment considerations, and management of puncture words.	1. Pathophysiology a. Considerations around depth of wound b. Considerations on type and speed of object that punctured the skin c. Consideration around infection d. Considerations on injury to underlying organs and tissues e. Considerations on location of the puncture f. Considerations about the size of the hole the object leaves in the body g. Most bleeding is internal 2. Special assessment findings a. Mechanism of injury b. Inspect the wound, do not probe c. Know underlying complications

	d. Infection problems when patient did not seek care e. Role to edema 3. Special management considerations a. Role of tetanus antitoxin b. Infection prevention c. Wound management d. Supportive care
12.6.5 – Burns	
C 12.6.5.1 – Discuss the pathophysiology, assessment considerations, and management of electrical burns.	1. Pathophysiology a. Ohm's law (role of voltage and resistance) b. Joule's law (relationship between heat production, current, and resistance) c. Body tissues vary in type of resistance to current d. Electrical current follows path of least resistance e. Severity influenced by i. Type of voltage circuit ii. Amperage of current iii. Resistance of the body iv. Pathway of the current v. Duration of the current f. Types of injury i. Thermal due to burning of clothing, etc. ii. Arc-type (causes high skin temperature leading to burns) iii. Electrical injury (as it travels through body, it heats up, causing tissue necrosis with entrance and exit rounds) 2. Special assessment findings a. Review previous knowledge b. Cardiac arrest c. Neuromuscular injuries i. Peripheral nerve deficit ii. Muscle coordination and strength d. Spinal cord involvement/injury 3. Special management considerations a. Scene safety b. Cardiac arrest management c. Cervical spine protection d. IV fluids if hypotension is present e. Transport to appropriate facility
C 12.6.5.2 – Discuss the pathophysiology, assessment considerations, and management of chemical burns.	1. Pathophysiology a. Many sources may cause burn b. Alkali exposure (produces): i. Liquefaction necrosis ii. Breakdown of protein and collagen iii. Saponification of fats iv. Dehydration of tissues v. Thrombosis of blood vessels vi. Deep penetrating injury vii. Little pain viii. Typically are cleaners (oven, fertilizers,

	industrial) c. Acids i. Cause coagulation necrosis and immediate pain ii. Frequently doesn't injure deeper tissues iii. Amount of damage depends on concentration of agent, quality of the agent, length of exposure, and depth of penetration d. Organic compounds 2. Special assessment findings a. Skin damage will depend on agent, length of exposure, BSB b. Know the agent c. Read the label d. Seek consultation with poison center 3. Special management considerations a. Use protective clothing/equipment when necessary b. Flush with copious amounts of water c. Alkalis may require several hours of irrigation d. Do not use neutralizing agents
C 12.6.5.3 – Discuss the pathophysiology, assessment considerations, and management of thermal burns.	1. Pathophysiology a. Heat absorbed exceeds capacity to dissipate it b. Depth will depend on time of contact and source c. Age variances with burns d. Severity depends on: i. Burn agent ii. Burn circumstances iii. Location of the burn on the body iv. Age of the patient v. Concomitant injuries vi. Preexisting injuries e. Epidermis injured f. Epidermis and varying layers of dermis g. Burn extends into subcutaneous tissue possibly including bone and muscle tissue h. Burns and burn effect on other body systems i. Cardiovascular involvement ii. Pulmonary involvement iii. Renal involvement iv. GI involvement v. Hematological involvement vi. Endocrine involvement 2. Special assessment finding a. Superficial partial thickness burn b. Moderate-deep partial thickness i. Red, moist surface, with extreme sensitivity (pain) to any stimuli ii. Formation of blisters is very common iii. In partial thickness burns, the deeper the burn the more painful

	iv. Have intact deep pressure sensation v. Color of deep partial thickness burns may be deceptive c. Full thickness i. White, waxy appearance ii. Charred/parched tan appearance iii. Black appearance iv. Skin dry, hard v. Lack of sensation or pain vi. Skin is incapable of self-regeneration d. Review percent of body surface burn estimation methods for adults, children, and infants e. Lund and Browder chart and BSB f. Classification systems i. Minor burn ii. Moderate burn iii. Major burn 3. Special management considerations a. Review previous knowledge b. AVO c. Patient with greater than 20% BSB needs fluid resuscitation d. Parkland burn formula e. Know signs of adequate fluid resuscitation f. Know signs of inadequate fluid resuscitation g. Pain management
12.6.6 – High-Pressure Injection Wounds	
C 12.6.6.1 – Discuss the pathophysiology, assessment considerations, and management of high-pressure injection wounds.	1. Pathophysiology 2. Special assessment findings 3. Special management considerations

12.7 – Head, Face, Neck, and Spine Trauma

Objective	Educational Standard
12.7.1 – Introduction	
C 12.7.1.1 – Discuss the incidence of head, facial, neck, and spinal trauma.	1. Head injury 2. Brain injury 3. Face injury
C 12.7.1.2 – Identify mechanisms of head, facial, neck, and spinal trauma.	1. Motor vehicle crashes 2. Sports 3. Falls 4. Penetrating trauma 5. Blunt trauma
C 12.7.1.3 – Discuss the morbidity and mortality of head, facial, neck, and spinal trauma.	N/A
C 12.7.1.4 – Identify categories of injury for head, facial, neck, and spinal trauma.	1. Coup 2. Contrecoup 3. Diffuse axonal injury ("DAI")
C 12.7.1.5 – Discuss causes of brain injury.	1. Direct/primary 2. Indirect/secondary/tertiary
C 12.7.1.6 – Identify injuries also associated with head, facial, neck, and spinal trauma.	1. Airway compromise 2. Cervical spine injury
C 12.7.1.7 – Discuss the prevention of head, facial, neck, and spinal trauma.	N/A
12.7.2 – Unstable Facial Fractures	
C 12.7.2.1 – Discuss the pathophysiology, assessment considerations, and management of unstable facial fractures.	1. Pathophysiology a. Categories of unstable facial fractures i. Le Forte I (fracture separates hard palate and lower maxilla from remainder of skull) ii. Le Forte II (fracture separates the nasal and lower maxilla from the facial skull and remainder of the cranial bones) iii. Le Forte III (craniofacial disjunction; fracture separates the entire midface from the cranium) b. Blunt trauma to the facial area most frequent cause 2. Specific assessment considerations a. Facial instability b. Epistaxis c. Edema d. Pain 3. Specific management considerations a. Simple airway maneuvers are difficult b. Intubation is method of choice for airway protection c. Ventilation without intubation is difficult d. Manual in-line intubation e. Bleeding into the oral cavity; suction f. Cricothyroidotomy, if indicated g. Soft tissue bleeding
12.7.3 – Orbital Fractures	

C 12.7.3.1 – Discuss the pathophysiology, assessment considerations, and management of orbital fractures.	1. Pathophysiology – Blunt trauma to the eye causes increased pressure to the globe of the eye. The pressure causes the weakest area (orbital floor) to give way, causing herniation of orbital contents (inferior oblique muscle entrapment) into the maxillary sinus. 2. Specific assessment considerations a. Mechanism of injury b. Sports injury (balls) c. Enophthalmos d. Impaired ocular mobility e. Diplopia f. Infraorbital hypoesthesia 3. Specific management considerations a. Assess for other injuries b. Patching both eyes c. Ice to reduce edema
12.7.4 – Perforated Tympanic Membrane	
C 12.7.4.1 – Discuss the pathophysiology, assessment considerations, and management of a perforated tympanic membrane.	1. Pathophysiology a. Pressure trauma (diving, water skiing) b. Direct blows c. Explosion or barotraumas d. Foreign objects 2. Specific assessment considerations a. Hemorrhagic otorrhea b. Hearing loss 3. Specific management considerations – Supportive care
12.7.5 – Skull Fractures	
C 12.7.5.1 – Discuss the pathophysiology, assessment considerations, and management of skull fractures.	1. Pathophysiology (fracture without brain injury) a. Linear b. Depressed c. Basilar d. Location and type of fracture is important e. Suspicion of underlying brain injury 2. Specific assessment considerations a. LOC b. Hemorrhage control – Depressed skull fractures may require circumferential digital pressure to control an open skull fracture bleed c. Fracture lines that cross the middle meningeal artery can be serious d. Underlying hematoma size can be significant e. CSF leakage 3. Specific management considerations a. Spinal cord precautions b. AVO i. High flow oxygen ii. Adequate ventilation (not hyperventilation) iii. No nasal airways of any kind for basilar skull fractures c. Document neurological assessment

	d. Transport to appropriate facility e. Monitor vital signs f. Supportive care
12.7.6 – Penetrating Neck Trauma (Non-Cord Involvement)	
C 12.7.6.1 – Discuss the pathophysiology, assessment considerations, and management of penetrating neck trauma (no spinal cord involvement).	1. Pathophysiology a. Blunt b. Penetrating c. Upper airway passages d. Larynx e. Vascular supply to brain f. Upper GI system g. Epiglottis 2. Specific assessment considerations a. Changes in voice b. Subcutaneous emphysema c. Equal carotid pulse strength d. Dysphagia e. Hemorrhage f. Hemoptysis g. Tracheal ring fracture 3. Specific management considerations a. Hemorrhage control (digital for carotid artery puncture) b. Intubation to protect the airway c. Voice rest (limited history)
12.7.7 – Laryngeotracheal Injuries	
C 12.7.7.1 – Discuss the pathophysiology, assessment considerations, and management of laryngeotracheal injuries.	1. Pathophysiology a. Trauma directly to structures b. Edema c. Hemorrhage 2. Specific assessment considerations a. Swelling b. Voice changes c. Hemoptyosis d. Subcutaneous emphysema e. Structural irregularity 3. Specific management considerations a. AVO i. Airway obstruction common ii. May need surgical airway b. Supportive multi-system care
12.7.8 – Spine Trauma (Non-CNS Involvement)	
C 12.7.8.1 – Discuss the pathophysiology, assessment considerations, and management of spinal trauma (no central nervous system involvement).	1. Pathophysiology 2. Specific assessment considerations a. Pain b. Point tenderness c. Neurologically intact/normal 3. Specific management considerations a. Spinal immobilization i. Seated ii. Standing

	b. AVO c. Supportive multi-system care
12.7.9 – Mandibular Fractures	
C 12.7.9.1 – Discuss the pathophysiology, assessment considerations, and management of mandibular fractures.	1. Pathophysiology 2. Specific assessment considerations a. Malocclusion of the teeth b. Pain c. Point tenderness d. Ecchymosis on the floor of the mouth 3. Specific management considerations a. AVO b. Non-use of nasal airways c. Ice d. Monitor closely

12.8 – Nervous System Trauma

Objective	Educational Standard
12.8.1 – Incidence	
C 12.8.1.1 – Describe the morbidity and mortality of nervous system trauma, including prevention strategies.	1. Morbidity/mortality 2. Prevention strategies
12.8.2 – Cauda Equine Syndrome	
C 12.8.2.1 – Discuss the pathophysiology, assessment considerations, and management of cauda equine syndrome.	1. Pathophysiology a. Cauda equine are spinal nerves descending at the end of the spinal cord. Not part of the cord, but a series of nerves that appears like a tail at the end of the spinal cord. b. The syndrome results from trauma to the lower back. 2. Special assessment considerations (signs and symptoms are nerve root dependent) a. Weakness of lower muscles (dependent upon which nerve root is injured) b. Loss of reflexes c. Hyperasthesia and later anesthesia in groin d. Incontinence e. Sexual dysfunction 3. Special management considerations
12.8.3 – Nerve Root Injury	
C 12.8.3.1 – Discuss the pathophysiology, assessment considerations, and management of nerve root injury.	1. Pathophysiology 2. Special assessment considerations 3. Special management considerations
12.8.4 – Peripheral Nerve Injury	
C 12.8.4.1 – Discuss the pathophysiology, assessment considerations, and management of a peripheral nerve injury.	1. Pathophysiology a. Trauma damages a nerve, or nerve group, between the ganglion and its intervention point b. Damage causes muscle or sections of the muscle to not function properly c. Damage causes sensation on the skin to be lost 2. Special assessment considerations a. MOI i. Fracture ii. Laceration involving nerve pathway iii. Penetrating trauma iv. Pressure (weight against a nerve pathway) b. Anesthesia c. Numbness d. Muscle weakness 3. Special management considerations a. Immobilize in anatomical position b. Reduce swelling
12.8.5 – Traumatic Brain Injury	
C 12.8.5.1 – Discuss the pathophysiology,	1. Pathophysiology a. Brain is very oxygen dependent

assessment considerations, and management of traumatic brain injuries.

b. Brain has very limited oxygen storing capacity
c. Loss of blood flow for five to ten seconds causes unconsciousness
d. Low $PaCO_2$ causes vasodilation
e. High $PaCO_2$ causes vasoconstriction
f. Coup injury to the brain
g. Countrecoup injury to the brain
h. Primary brain injury
i. Secondary brain injury
j. Center of consciousness (reticular activating system)
k. Coma
l. Posturing (decerebrate, decorticate)
m. Normal intracranial pressure (2 to 12 mm Hg)
n. Cushing's triad (increased blood pressure, decreased pulse, and irregular respirations)
o. Brain herniation
    i. Uncal herniation
    ii. Central herniation syndrome
    iii. Cerebellar herniation
p. Skull fractures
    i. Linear
    ii. Depressed
    iii. Open
    iv. Basilar
q. Concussion
r. Diffuse axonal injury
s. Contusion
t. Cerebral lacerations
u. Epidural hematoma
v. Subdural hematoma
    i. Acute
    ii. Chronic
w. Subarachnoid hemorrhages
x. Intracerebral hematomas
y. Penetrating brain trauma

2. Specific assessment considerations
    a. LOC
    b. AVO
    c. Spinal concerns
    d. Vital sign irregularities
    e. Posturing
    f. Pupil reactions
    g. CSF presence
    h. Cranial nerve damage signs
    i. Bilateral strength of muscle groups
    j. Doll's eyes
    k. Coma assessment
    l. Neurological exam
        i. LOC
        ii. Pupil function
        iii. Peripheral sensory/motor
        iv. Reflexes

	3. Special management considerations a. AVO with spinal precautions/immobilization i. Neuromuscular blocking agents ii. Surgical airways with massive facial trauma iii. Ventilate/assist to maintain PaO_2 of 90 mm Hg b. MOI i. Blunt ii. Penetrating c. History i. Amnesia ii. Retrograde amnesia d. Vital signs i. Cheyne-stokes ii. Cushing's triad e. Pharmacological agents f. Seizure precautions/treatment g. Volume replacement in multi-system trauma h. Role of hypothermia i. Role of neuroprotective agents j. Role of steroids
12.8.6 – Spinal Cord Injury	
C 12.8.6.1 – Discuss the pathophysiology, assessment considerations, and management of spinal cord injuries.	1. Pathophysiology a. Mechanism of injury i. Axial loading ii. Flexion iii. Hyperflexion iv. Hyperrotation v. Lateral bending vi. Distraction vii. Cord concussion viii. Cord contusion ix. Cord compression x. Laceration b. Complete cord lesions c. Incomplete cord lesions i. Brown-Sequard's syndrome (penetrating trauma) ii. Anterior cord syndrome (pressure/damage on anterior spinal cord) iii. Central cord syndrome (contusion to cord, hyperextension, or flexion mechanisms) d. Neurogenic shock i. Loss of control between injury site and brain ii. Vasodilation iii. Loss of balance between parasympathetic and sympathetic nervous systems e. Paralytic ileus 2. Special assessment considerations

	a. Dermatome assessment b. Complete i. No pain below injury site ii. No sensation to pressure below injury site iii. No feeling of sensation below injury site iv. No movement below injury site c. Incomplete i. Brown-Sequard 1. Signs on one side of body 2. Ipsilateral motor loss 3. Ipsilateral loss of proprioception 4. Contralateral loss of pain and temperature sensation ii. Anterior 1. Loss of voluntary and reflex motor activity 2. Loss of pain and temperature sensation 3. Preservation of proprioception, vibratory sense, and ability to sense light pressure iii. Central cord 1. Changes mainly effect upper extremities 2. Loss of feeling in upper extremities, but presence in lower extremities 3. Paresis often more pronounced distally in upper extremities than proximal 3. Special management considerations a. Spinal immobilization b. AVO c. Pharmacological agents (anti-inflammatory) d. Dermatome assessment and anatomical regional effects with spinal injury
12.8.7 – Spinal Shock	
C 12.8.7.1 – Discuss the pathophysiology, assessment considerations, and management of spinal shock.	1. Pathophysiology a. Loss of control between injury site and brain b. Vasodilation c. Loss of balance between parasympathetic and sympathetic nervous systems d. Lasts 7 to 20 days e. Autonomic hyperreflexia 2. Special assessment considerations a. Flaccid muscles b. Paralysis c. Absence of sensation d. Hypotension e. Hypothermia 3. Special management considerations a. AVO b. IV bolus c. Vasopressor considerations

d. Pharmacological assistance

12.9 – Special Considerations in Trauma

Objective	Educational Standard
12.9.1 – Trauma in Pregnancy	
C 12.9.1.1 – Discuss the incidence, pathophysiology, assessment considerations, and management of traumatic injury given a pregnant patient.	1. Incidence a. Mortality/morbidity b. Risk factors c. Prevention 2. Pathophysiology a. Exhibit responses different due to physiologic changes during pregnancy b. Mother i. Blood volume changes ii. Respiratory changes iii. GI and intra-abdominal changes c. Fetus d. Fetal death caused by: i. Maternal loss (trauma leading to shock) ii. Abruptio placentae (need high index of suspicion) e. Abdominal injuries f. Pelvic fracture g. Traumatic arrest h. Seat belt injuries i. Sexual assault 3. Special considerations in assessment a. Increased heart rate is not an early sign of hypovolemic shock b. Significant blood loss may not be reflective of usual signs of shock c. Respiratory rate less than 20 should not be considered adequate ventilation d. Loss of landmarks for chest compressions in arrest e. MOI and signs of abruption placentae f. Estimate gestational age of baby g. Palpate uterine fundus h. Attempt to listen to fetal heart tones (4 o'clock position, about 2" from mother umbilicus) 4. Special considerations in management a. Airway, breathing, and circulation b. Maternal management c. Fetal assessment
12.9.2 – Pediatric Trauma	
C 12.9.2.1 – Discuss the unique aspects, pathophysiology, assessment considerations, and management of traumatic injuries in pediatric patients.	1. Unique pediatric aspects of trauma a. Most common is motor vehicle-related b. Blunt trauma most prevalent MOI c. Intentional injuries d. Suicide in adolescents e. Children in trauma more rapidly decompensate f. Child abuse causes trauma g. Strong catecholamine capabilities

2. Pathophysiology
   a. Head (most common injured)
      i. Larger than adults
      ii. Large occiput flexes head, compromising airway
      iii. Suture flexibility in very young
      iv. Newborns and infants can become hypotensive with head injuries
   b. Spine – SCIWORA
   c. Chest
      i. Very compliant (injury requires great force)
      ii. Commotio cordis (sudden impact of blunt force to the chest resulting in cardiac dysfunction, even death)
   d. Abdomen
      i. Larger solid organs
      ii. Weak abdominal muscles
   e. Musculoskeletal
      i. Epiphyseal plate
      ii. Bones heal faster
3. Special considerations in assessment
   a. Airway, breathing, and circulation
      i. Small mouth and airways (easily obstructed)
      ii. Use of sniffing position
      iii. Large tongue in infant makes ET more difficult
      iv. Mainstem intubation precautions
   b. Circulation
      i. Hypotension appears late, use other signs of inadequate circulation
      ii. Inadequate oxygenation causes bradycardia
      iii. Capillary refill may be helpful
      iv. LOC may indicate inadequate circulation
      v. Blood pressure estimated as 80 + 2 times the age
      vi. Appropriate blood pressure cuff size
      vii. 80 ml/kg blood loss can cause shock
   c. Head
      i. Very vascular, even scalp laceration can cause shock
      ii. Falls less than five feet are significant
      iii. Beware of shaken baby syndrome
      iv. GCS less than eight means increased ICP
   d. Chest
      i. Significant internal injury can be present without any external signs
      ii. Tension-pneumothorax is difficult to evaluate
   e. Abdomen
      i. Spleen most common injured
      ii. Cullen's sign
      iii. Kehr's sign

	f. Musculoskeletal trauma 4. Special considerations in management a. Airway, breathing, and circulation (improper management is the most common cause of preventable pediatric death) i. Intubation complications ii. High-concentration oxygen and saturation iii. Proper endotracheal tube size considerations iv. Nasotracheal intubation is contraindicated b. Circulation i. IVs at 20 ml/kg bolus ii. IO if no damage in lower extremity c. Head i. Elevate during transport ii. Seizure precautions d. Spinal i. Adequate size c-collars are important ii. Padding with immobilization e. Abdomen f. Extremity g. Transportation
12.9.3 – Geriatric Trauma	
C 12.9.3.1 – Discuss the unique aspects, pathophysiology, assessment considerations, and management of traumatic injuries in geriatric patients.	1. Unique geriatric aspects of trauma 2. Pathophysiology a. Most changes occur after age 80 if the patient is in general good health b. Respiratory i. Chest wall less compliant ii. Less vital capacity iii. Decrease in ciliary action c. Cardiovascular i. Heart rate and stroke volume decrease ii. Dysrhythmia changes d. Neurological system i. Neuron mass reduction ii. Velocity of impulses iii. Mentation changes iv. Thermoregulation changes e. Gastrointestinal f. Renal g. Musculoskeletal h. Integumentary i. Immune 3. Special considerations in assessment a. History i. Unreliable historians ii. Mentation, dementia iii. Family members as historians b. Decreased tolerance to heat loss 4. Special considerations in management a. Airway, breathing, and circulation

	i. Mask seal ii. Cervical kyphosis iii. Oxygen saturation can quickly deteriorate b. Circulation – Over hydration in patient with cardiac history 5. Specific injuries/diseases management a. Shock b. Head injuries c. Musculoskeletal injuries d. Burns e. Abuse
12.9.4 – Cognitively Impaired Patient	
C 12.9.4.1 – Discuss the unique challenges, assessment considerations, and management of traumatic injuries in cognitively impaired patients.	1. Unique challenges with cognitively impaired patients a. Ability of individual to communicate complaints b. Unreliable historian c. Unusual presentation of common disorders d. Reduced pain threshold e. Consent to treat complications f. Most commonly mental retardation (IQ less than 70) g. 1% to 2.5% of population has mental retardation h. Autism (differences in social, communication, and ability to purposefully shift attention; may become agitated with touch) 2. Special considerations in assessment a. Level of development i. 5th or 6th grade level is common ii. Use open-ended questions to assess development iii. Particular difficulty with time and causality concepts iv. Use a high function concept and have them repeat it back b. Use family and caregivers as part of history gathering i. How does patient normally communicate? ii. How aware are they of environment? iii. What are usual motor skills and level of activity? iv. What are the patient's usual sleep pattern and appetite? c. Assess/determine hearing and sight problems d. Take vital signs when patient is calm e. Typically helpful to have a caregiver present during physical exam 3. Special considerations in management a. Treatment is the same

	b. Suspect common disorders in the age population i. Injuries ii. Infections iii. Seizures iv. Delirium v. Psychiatric disorders vi. GI disorders

12.10 – Environmental Emergencies

Objective	Educational Standard
12.10.1 – Incidence	
C 12.10.1.1 – Describe the morbidity, mortality, and risk factors of environmental emergencies, including prevention strategies	1. Morbidity/mortality 2. Risk factors a. Pediatric considerations b. Geriatric considerations c. Fitness/body mass index d. Age e. Gender f. Medical conditions g. Medications h. Hydration 3. Prevention a. Personal Protective Equipment ("PPE") b. Climate acclimatization c. Policies/procedures for work conditions d. Hydration with food, beverage, electrolyte replacement e. Measuring heat stress index i. Wet-bulb globe temperature (humidity) ii. Dry bulb temperature (radiant) iii. Black glove temperature (ambient) f. Minimize fatigue g. Muscular strength and endurance training
12.10.2 – Submersion Incidents	
C 12.10.2.1 – Discuss the pathophysiology, assessment considerations, and management of submersion incidents.	1. Pathophysiology – Near drowning a. Patient survives 24 hours after submersion incident (asphyxiation) b. Wet drowning c. Dry drowning d. Hypoxia causes the chain of events toward death e. Post-submersion syndrome 2. Special assessment considerations a. Diving emergencies i. Signs of bends occur within 15 minutes to 12 hours after surfacing ii. Signs of bends 1. Happens in patients with a recent diving history 2. Pain in joints 3. Fatigue 4. Weakness iii. Blood pressure cuff over affected joint b. Near drowning i. Apnea to cardiac arrest ii. Post-submersion syndrome iii. Injury prevention participation 3. Special management considerations a. Diving i. Rapid transport to decompression facility

	ii. 100% oxygen administration b. Near drowning
12.10.3 – Temperature-Related Illness	
C 12.10.3.1 – Discuss the pathophysiology, assessment considerations, and management of temperature-related incidents.	1. Pathophysiology a. Heat illness i. Heat physiology 1. Conduction 2. Convection 3. Radiation 4. Evaporation 5. Thermosensors 6. Central nervous system function 7. Thermoregulatory effectors ii. Predisposing factors for heat illness iii. Fever versus hyperthermia iv. Thermometry v. Heat cramps 1. Brief, muscle cramps of fatigued muscles 2. Related to electrolyte imbalance in muscles vi. Heat syncope 1. Mostly seen in elderly 2. Much blood in periphery to increase heat loss causes inability to compensate/control blood pressure when standing vii. Prickly heat viii. Heat exhaustion 1. Water depletion 2. Salt depletion ix. Heat stroke 1. Malfunction of sodium pump in thermoregulatory cells 2. Exact temperature that causes is unknown, but near 112°F 3. Damage is dependent on multiple factors 4. Failure to perfuse skin with heated core blood dramatically increases rate of heat storage 5. Loss of sweating mechanism does not cause heat stroke b. Cold-related illness i. Frost bite ii. Accidental hypothermia 2. Special assessment considerations a. Heat illness i. Prickly heat, gland ducts can become infectious ii. Heat exhaustion 1. Variable and non-specific 2. Weakness, fatigue, headache, impaired judgment, vertigo

3. Moderately elevated core temperature
iii. Heat stroke
1. Prolonged heat stress/exhaustion
2. Signs of CNS dysfunction (coma, seizures, delirium)
3. Hot, dry skin
4. Tachycardia
5. Often under-diagnosed due to lack of presence of classic symptoms

b. Frostbite
i. Pathophysiology
1. Freezing injury cascade
2. Microvasoconstriction and local fluid shifting
3. Temperature in local area drops below 0°C
4. Ice forms outside the cell causing osmotic disequilibrium
5. Cells function lost
6. Freezing of circulation fluids
7. Anaerobic function of cells, pressure on cells, thrombus in local tissues, ischemia to necrosis
ii. Predisposing factors
iii. Types during local tissue freezing
1. Frostnip
2. Chilblains
3. Trench foot

c. Accidental hypothermia
i. Due to submersion or prolonged exposure to cold temperatures
ii. Risk is high for young and elderly, patients who cannot generate heat (diseases and medications)
iii. Vasoconstriction produces peripheral tissue ischemia
iv. Continued drops in temperature causes hypothalamic center to stimulate shivering
v. If cold continues, vasoconstriction is lost and then vasodilation occurs with loss of core heat to the periphery
vi. At 85° the individual becomes stuporous, cardiac output drops, cerebral blood flow is decreased
vii. At 78° v-fib and cardiovascular collapse are common

3. Special management considerations
a. Heat illness – Heat cramps
i. IVs of salt-containing solutions
ii. Oral intake of electrolyte solutions
b. Heat syncope
i. Lay victim flat
ii. Keep people moving in heated

	environments c. Heat exhaustion i. IV therapy ii. Cold environment d. Heat stroke i. Initial cooling ii. Ice water or ice application iii. Fanning of patient who is wet with cold/ice water iv. Supportive care for seizures, electrolyte imbalance v. IV therapy vi. Sedation if agitated e. Frostbite i. Consider re-warming only if potential to re-freeze does not exist ii. Remove wet clothing iii. Move to warm environment iv. If re-warming, tepid, near body heat, water immersion of extremity, usually requires 10 to 30 minutes immersion v. Pain relief medications are essential with re-warming f. Accidental hypothermia i. AVO – Consider intubation if no gag reflex ii. Circulation 1. Cardiac monitor 2. IV insertion, fluid challenge, warm fluids 3. CPR if indicated iii. Passive re-warming techniques iv. Active re-warming techniques
12.10.4 – Bites and Envenomations	
C 12.10.4.1 – Discuss the pathophysiology, assessment considerations, and management of bites and envenomations.	1. Injuries of concern a. Spider bites b. Snake bites c. Hymenoptera (bees, wasps, ants, yellow jackets) 2. Pathophysiology of bites and envenomations a. Spider bites (black widow) i. Inject neurotoxins, designed to digest its prey ii. Toxin plays a role in the function of acetylcholine in nerve impulse transmission b. Snake bites i. Toxins effect blood and nervous system both at the bite site and systematically ii. Many toxins cause the patient's cells to release bradykinins, histamines, and serotonin iii. Patient age and size cause different effects

	iv. Amount of toxin injected has effect (often none at all) v. Initial six to eight hours of care is essential c. Hymenoptera (bee, wasp, or other winged insect) i. Cause allergic reactions in sensitized (allergic) people ii. Often leads to anaphylactic response 3. Signs and symptoms a. Spider bite (black widow) i. Localized swelling initially ii. Chest or abdominal pain depending on bite site iii. Dangerous in children, may be fatal b. Rattlesnake bite i. Time of bite to care is important ii. Pain at site iii. Edema iv. Progressive weakness v. Nausea and vomiting vi. Seizures vii. Vision problems viii. Changes in LOC c. Bee, wasp, and other stings i. Pain at site ii. Swelling iii. Signs of allergic reaction iv. Signs of anaphylaxis 4. Unique management considerations of bites and stings a. Spider bite (black widow) i. Ice pack to area of bite ii. Clean wound with soap and water iii. Transport immediately with supportive care b. Rattlesnake bite i. Note time of bite to transport ii. Slow venous return, place venous constricting bands iii. Keep patient calm iv. Immobilize extremity v. Clean bite site with soap and water vi. Identify snake if possible c. Bees, wasps, and other stings i. Quickly remove stinger or venom sac ii. If anaphylaxis develops, follow protocol
12.10.5 – Electrical Injury (Lightning Strikes)	
C 12.10.5.1 – Discuss the pathophysiology, assessment considerations, and management of electrical injury from lightning strikes.	1. Pathophysiology a. Pathophysiology similar to electrical burns b. MOI i. Direct strike ii. Side flash “splash”

	iii. Ground current or step voltage iv. Blunt trauma v. Contact c. Major problem is cardiorespiratory (as opposed to cardiopulmonary) arrest (massive DC countershock) d. May cause head trauma, cardiac damage, burns, extremity vasospasm, paresis, or parethesias 2. Special assessment considerations a. Scene safety b. Assess for cardiac arrest 3. Special management considerations a. AVO b. Cardiac arrest management c. Burn wound care d. Transport
12.10.6 – High Altitude Illness	
C 12.10.6.1 – Discuss the pathophysiology, assessment considerations, and management of high altitude illness.	1. Pathophysiology 2. Special assessment considerations a. Vary depending on speed of ascent and time at elevation – Headache, anorexia, nausea, fatigue, dizziness, difficulty sleeping b. HAPE (high altitude pulmonary edema) c. High altitude retinal hemorrhage 3. Special management considerations a. Reduce altitude as fast as possible b. Mile cases are self-limited c. Moderate, aspirin, acetaminophen d. Severe requires diuretics, oxygen, steroids e. Prevention is best, man patients take actezolamide

12.11 – Multi-System Trauma

Objective	Educational Standard
12.11.1 – Kinematics of Trauma	
C 12.11.1.1 – Discuss the kinematics of trauma.	1. Looking at trauma scene and attempting to determine what injuries might have resulted 2. Kinetic energy (function of weight of an item and its speed) 3. Blunt trauma a. Objects collide during crashes i. Car with object ii. Victim with part of car iii. Organs collide inside body b. Unbelted drivers and front seat passengers suffer multi-system trauma due to multiple collisions of the body and organs c. Direction of the force has impact on type of injury i. Frontal impacts ii. Rear impacts iii. Side impacts iv. Rotational impacts v. Roll-overs 4. Deceleration injuries 5. Penetrating traumas a. Types of bullets have effect i. Distance from shooter ii. Size of bullet iii. Fragmentation iv. Cavitation b. Energy levels have effect i. Low energy (stabbings) ii. Medium energy (handguns and some rifles) iii. High energy (military weapons) c. Organs struck have effect i. Head ii. Chest iii. Abdomen iv. Extremities
12.11.2 – Multi-System Trauma	
C 12.11.2.1 – Define multi-system trauma.	1. Almost all trauma affects more than one system 2. Typically a patient considered to have "multi-trauma" has more than one major system or organ involved (examples): a. Head and spinal trauma b. Chest and abdominal trauma c. Chest and multiple extremity trauma 3. Multi-system trauma treatment will involve a team of physicians to treat the patient, such as neurosurgeons, thoracic surgeons, and orthopedic surgeons 4. Multi-system trauma has a high level of morbidity and mortality

C 12.11.2.2 – Discuss the golden principles of out-of-hospital trauma care.	1. Safety of patient and rescue personnel 2. Determination of additional resources 3. Kinematics a. Mechanism of injury b. High index of suspicion 4. Identify and manage life threats 5. Airway management while maintaining cervical spinal immobilization 6. Support ventilation and oxygenation 7. Control external hemorrhage 8. Basic shock therapy a. Maintain normal body temperature b. Splint musculoskeletal injuries 9. Maintain spinal immobilization on long board a. Standing patients b. Sitting patients c. Rapid transport considerations d. Prone patients e. Supine patients 10. Transportation considerations a. Golden period b. Closest appropriate facility c. "Platinum 10 minutes" 11. Obtain medical history 12. Secondary survey after maintenance of life threats 13. "Do no further harm"
C 12.11.2.3 – Discuss critical thinking in multi-system trauma care.	1. Airway, ventilation, and oxygenation are key elements to success a. Airways must be opened and clear throughout care b. Adequate ventilation must occur c. Oxygenation in multi-system trauma is high concentrations of oxygen 2. Oxygenation cannot occur when patients are bleeding profusely a. Stop arterial bleeding rapidly b. Consider use of tourniquets in emergent, hostile, or multiple patient situations where bleeding is considerable 3. Sequence of treating patients a. Not all treatments are linear b. At times care must be adjusted, depending on the needs of the patient (example): i. Control arterial bleeding in an awake patient first ii. Much care can be done en route 4. Rapid transport is essential a. The definitive care for multi-system trauma is surgery, which can not be done in the field b. On-scene time is critical and should not be delayed c. Rapid extraction is an important consideration d. Use of ALS intercept and air medical

	resources in a multi-system trauma patient should be highly considered e. Early notification of hospital resources is essential once rapidly leaving the scene f. Transport to the appropriate facility is critical 5. Backboards 6. Documentation and reporting a. EMTs are the eyes and ears of the physicians b. EMTs need to re-create the scene c. Important kinematics and mechanisms of injury are important to trauma teams d. Changes in vital signs or assessment findings while en-route are critical to report and document 7. Personal safety a. Most important when arriving on scene, and throughout care; an injured EMT cannot provide care b. Be sure to assess your environment i. Passing automobiles ii. Hazardous situation iii. Hostile environments iv. Unsecured crime scenes v. Suicidal patients who may become homicidal 8. Experience a. Newly licensed paramedics who have not seen many multi-system trauma patients need to stick with the basics of life-saving techniques b. Do not develop "tunnel" vision by focusing on patients who complain of lots of pain and are screaming for your help while other patients who may be hypoxic or bleeding internally can not call out for help because of decreases in level of consciousness c. Be suspicious at trauma scenes, sometimes and obvious injury is not the critical cause of the potential for harm d. Trauma care is a leading cause of death in young people (it is essential to keep important care principles in mind when providing care)
12.11.3 – Specific Injuries Related to Multi-System Trauma	
C 12.11.3.1 – Discuss the pathophysiology, signs/symptoms, and management of multi-system trauma resulting from blast injuries.	1. Types of blast injuries (explosions) a. Blast waves b. Blast winds c. Ground shock d. Heat 2. Pathophysiology a. Blast waves when the victim is close to the blast cause, disruption of major blood

vessels, rupture of major organs, and lethal cardiac disturbances
   b. Blast winds and ground shock can collapse buildings, causing trauma
3. Signs/symptoms
   a. Hollow organs are injured first
   b. Multi-system injury sign and symptom patterns
      i. Lungs
      ii. Heart
      iii. Major blood vessels
4. Management considerations in blast injuries
   a. Multi-system trauma care
   b. Immediate transport to appropriate facility
   c. Multi-casualty care

13.0 – Special Patient Populations

Integrates assessment findings with principles of pathophysiology and knowledge of psychosocial needs to formulate a field impression and implement a comprehensive treatment/disposition plan for patients with special needs.

13.1 – Obstetrics

Objective	Educational Standard
13.1.1 – Introduction	
C 13.1.1.1 – Discuss the female reproductive system and reproductive cycle.	1. Anatomy and physiology review of the female reproductive system a. Uterus b. Cervix c. Ovaries d. Vagina e. Breasts 2. Female reproductive cycle a. Female hormones i. Estrogen ii. Progesterone iii. Prostaglandins b. Neurohormonal basis c. Ovarian cycle d. Menstrual cycle 3. Cultural values affecting pregnancy 4. Special considerations of adolescent pregnancy
13.1.2 – Physiology	
C 13.1.2.1 – Discuss the physiology of pregnancy.	1. Normal anatomical, physiological, and psychological changes in pregnancy a. Reproductive system b. Respiratory system c. Cardiovascular system d. Gastrointestinal system e. Urinary tract f. Skin, hair, and eyes g. Musculoskeletal system h. Metabolism i. Endocrine i. System ii. Hormones in pregnancy j. Psychological 2. Identify normal events of pregnancy 3. Conception and fetal development a. Ovulation b. Fertilization c. Implantation d. Fetal circulatory system e. Embryonic stage f. Fetal stage 4. Development and functions of the placenta

	a. Placental circulation b. Placental functions c. Transfer of gases d. Transport of nutrients e. Hormone production f. Protection
13.1.3 – General System Physiology, Assessment, and Management of the Obstetrical Patient	
C 13.1.3.1 – Discuss the signs, stages, assessment, and management of labor and delivery.	1. Premonitory signs of labor a. Lightening b. Braxton Hicks c. Cervical changes d. Bloody show e. Rupture membrane f. Other 2. Stages of labor and delivery a. First stage i. Latent ii. Active iii. Transition b. Second stage i. Spontaneous birth ii. Positional changes of the fetus 1. Descent 2. Flexion 3. Internal rotation 4. Extension 5. Restitution 6. External rotation 7. Expulsion c. Third stage i. Placental separation ii. Placental delivery d. Maternal response to labor i. Cardiovascular ii. Respiratory iii. Renal iv. Gastrointestinal v. Immune system vi. Pain e. Fetal response to labor i. Heart rate ii. Acid-base status iii. Hemodynamic iv. Sensation 3. Assessment of the pregnant patient a. Airway, breathing, circulation b. Initial assessment c. SAMPLE history d. Vital signs e. Obstetrical history f. Physical examination g. Evaluating gestational age

	i. Fundal measurement ii. Calculating estimated date of birth h. Fetal movement i. Fetal heart tones j. Deep tendon reflexes k. Inspect for crowning 4. Management of a normal delivery obstetrical patient – Treatment modalities a. Oxygen b. Non-pharmacological intervention i. Positioning ii. IV access iii. Cardiac monitor c. Pharmacological interventions i. Fluids ii. Analgesia 5. Postpartum care a. Assessment of fundus b. Quality of lochia c. Signs of hemorrhage
13.1.4 – Complications Related to Pregnancy	
C 13.1.4.1 – Discuss pathophysiology, assessment, and management of complications related to pregnancy.	1. Abuse 2. Substance abuse 3. Supine hypotensive disorder 4. Diabetes mellitus a. Pathophysiology b. Assessment c. Management 5. Various cardiac disorders a. Pathophysiology b. Assessment c. Management 6. Bleeding related to pregnancy a. Pathophysiology b. Assessment c. Management d. Abortion i. Elective abortion ii. Spontaneous abortion iii. Threatened iv. Imminent v. Complete vi. Incomplete vii. Missed viii. Habitual ix. Septic e. Ectopic pregnancy 7. Placental problems a. Pathophysiology b. Assessment c. Management d. Abruption placenta e. Placenta previa

	8. Hyperemesis gravidum a. Pathophysiology b. Assessment c. Management 9. Hypertensive disorders a. Pathophysiology b. Assessment c. Management d. Pregnancy induced hypertension e. Preeclampsia f. Eclampsia 10. rH sensitization 11. Infections a. HIV b. TORCH i. Toxoplasmosis ii. Rubella iii. Cytomegalovirus iv. Herpes c. Urinary tract d. Vaginal e. Sexually transmitted infections i. Candidiasis ii. Trichomoniasis iii. Bacterial vaginosis iv. Chlamydial infection v. Gonorrhea vi. Syphilis vii. Hyman papilloma virus
13.1.5 – High Risk Pregnancy: Pathophysiology, Assessment, Complications, and Management	
C 13.1.5.1 – Discuss the pathophysiology, assessment, complications, and management of high-risk pregnancies.	1. Precipitous labor and birth 2. Post term pregnancy 3. Meconium staining 4. Fetal macrosomia 5. Multiple gestation 6. Intrauterine fetal death 7. Amniotic fluid embolism 8. Hydramnios 9. Cephalopelvic disproportion
13.1.6 – Complications of Labor: Pathophysiology, Assessment, Complications, and Management	
C 13.1.6.1 – Discuss the pathophysiology, assessment, complications, and management of complicated labor.	1. Premature rupture of membranes 2. Preterm labor 3. Uterus rupture 4. Fetal distress
13.1.7 – Complications of Delivery: Pathophysiology, Assessment, Complications, and Management	
C 13.1.7.1 – Discuss the pathophysiology,	1. Cephalic presentation

assessment, complications, and management of complicated deliveries.	a. Occiput (posterior) b. Face c. Brow d. Military 2. Breech a. Frank b. Incomplete c. Complete d. Transverse 3. Shoulder dystocia 4. Nuchal cord 5. Prolapse of cord 6. Postpartum complications a. Pathophysiology b. Assessment c. Complications d. Management e. Inverted uterus f. Hemorrhage i. Early 1. Uterine atony 2. Lacerations 3. Retained placental fragments ii. Late g. Embolism h. Post partum depression

13.2 – Neonatal Care

Objective	Educational Standard
13.2.1 – Introduction	
C 13.2.1.1 – Define newborn and neonate.	1. Newborn (a recently born infant; usually considered the first few hours of life) 2. Neonate (considered the first 28 days of life)
13.2.2 – General Pathophysiology, Assessment, and Management	
C 13.2.2.1 – Discuss the epidemiology, pathophysiology, assessment, and management of newborns/neonates.	1. Epidemiology a. Incidence i. Approximately 6% of deliveries required life support ii. Incidence of complications increases as birth weight decreases b. Morbidity/mortality i. Neonatal mortality risk can be determined via graphs based on birth weight and gestational age ii. Resuscitation is required for about 80% of the 30,000 babies who weight less than 1,500 grams at birth c. Risk factors i. Antepartum factors 1. Multiple gestation 2. Inadequate prenatal care 3. Mother's age <16 or >35 4. History of perinatal morbidity or mortality 5. Post-term gestation 6. Drugs/medications 7. Toxemia, hypertension, diabetes 8. Perinatal infections 9. Known fetal malformations/"high risk" OB patient ii. Intrapartum factors 1. Premature labor 2. Meconium-stained amniotic fluid 3. Rupture of membranes greater than 18 hours prior to delivery 4. Use of narcotics within four hours of delivery 5. Abnormal presentation 6. Prolonged labor or precipitous delivery 7. Prolapsed cord 8. Bleeding d. Treatment strategies 2. Pathophysiology a. Transition from fetal to neonatal circulation b. Respiratory system must suddenly initiate and maintain oxygenation c. Newborns are very sensitive to hypoxia d. Permanent brain damage will occur with hypoxemia e. Apnea in newborns i. Primary ii. Secondary f. Congenital anomalies i. Diaphragmatic hernia ii. Choanal atresia

iii. Pierre Robin syndrome
iv. Cleft lip
v. Other craniofacial defects
vi. Spina bifida
vii. Exposed abdominal contents
1. Intact omphalocele
2. Non-intact omphalocele
viii. Other common conditions

3. Assessment of the newborn
a. Time of delivery
b. Normal/abnormal vital signs
c. Airway and ventilation
i. Respiratory rate
ii. Respiratory effort
d. Circulation
i. Heart rate
ii. Color/cyanosis
1. Normal
2. Central versus peripheral
3. Mucosal membranes
iii. End organ perfusion
1. Compare strength of central pulses versus peripheral
2. Capillary refill
e. APGAR
i. Appearance (skin color)
1. Completely pink (2)
2. Body pink, extremities blue (1)
3. Blue, pale (0)
ii. Pulse rate
1. Above 100 (2)
2. Below 100 (1)
3. Absent (0)
iii. Grimace (irritability)
1. Cries (2)
2. Grimaces (1)
3. No response (0)
iv. Activity (muscle tone)
1. Active motion (2)
2. Some flexion of extremities (1)
3. Limp (0)
v. Respiratory (effort)
1. Strong cry (2)
2. Slow and irregular (1)
3. Absent (0)

4. Treatment
a. Prior to delivery, prepare environment and equipment
b. During delivery, suction mouth and nose as head delivers
c. After delivery
i. Airway and ventilation
1. Drying
a. Head and face
b. Body
2. Warming
a. Appropriate techniques

b. Minimize heat loss via head
3. Position
4. Suction
   a. Technique
      i. Mouth first, then nares
      ii. Nasal suctioning is a stimulus to breathe
   b. Equipment
      i. Bulb suction
      ii. Suction catheters
      iii. Meconium aspirator
5. Stimulation
   a. Flicking soles of feet
   b. Stroking back
6. Blow-by oxygen
   a. Never withhold oxygen
   b. Oxygen should be warmed
   c. Use when
      i. Newborn is cyanotic and
      ii. Heart rate > 100 and
      iii. Adequate respiratory rate and effort
   d. 5 lpm maximum
      i. Complications due to hypothermia
      ii. Direct rather than tangential flow on face
   e. Appropriate techniques
7. Oral airways (rarely used for neonates)
   a. Necessary to keep mouth open for ventilation
   b. Bilateral choanal atresia
   c. Pierre Robin syndrome
   d. Macroglossia
   e. Craniofacial defects affecting airway
8. Bag-valve mask
   a. Mask characteristics
      i. Appropriate size
      ii. Minimize dead-space
   b. Bag characteristics
      i. Pop-off valve should be disabled
      ii. Risk of pneumothorax with excessive pressures
      iii. Initial breath may require high pressures
   c. Use when
      i. Apneic
      ii. Inadequate respiratory rate or effort
      iii. Heart rate less than 100
   d. Technique
      i. Initial ventilations require higher pressure to expand lungs
      ii. Rate
9. Intubation
   a. Indications
      i. Prolonged positive pressure ventilation
      ii. Bag and mask ventilations ineffective
      iii. Tracheal suctioning required
      iv. Diaphragmatic hernia suspected
      v. Craniofacial defects that impede ability to maintain adequate airway

b. Technique
   i. Suction equipment
   ii. Larnygoscope
   iii. Blades (straight)
      1. #1 (full term)
      2. #0 (preterm)
   iv. Endotracheal tubes (2.5 mm to 4 mm id)
   v. Shoulder roll
   vi. Adhesive tape
c. Confirmation
   i. Visualization
      1. Tube passing through the cords
      2. Chest expansion with ventilation
   ii. Auscultation
      1. Laterally and high on the chest wall
      2. Epigastric region
   iii. Patient improvement
   iv. $EtCO_2$
   v. Pulse Oximetry
d. PEEP

10. Gastric decompression
    a. Abdominal distention is impeding ventilation
    b. Presence of diaphragmatic hernia
    c. Tracheo-esophageal fistula

ii. Circulation
1. Vascular access
   a. Indications
      i. To administer fluids
      ii. To administer medications
   b. Peripheral vein cannulation
   c. Intraosseous cannulation
2. Chest compression (in addition to assisted ventilation with BVM), refer to current ILCOR/AHA guidelines

iii. Pharmacological
1. Bradycardia
2. Low blood volume
3. Respiration depression secondary to narcotics
4. Metabolic acidosis
5. Hypoglycemia

iv. Non-pharmacological
1. Temperature control
2. Positioning

v. Transport considerations
1. Rapid transportation of the distressed newborn
2. Position newborn o their side to prevent aspiration
3. Adequate securing of ETT

vi. Psychological support/communication strategies

13.2.3 – Specific Situations

C 13.2.3.1 – Discuss the epidemiology, pathophysiology, assessment, and management of specific newborn/neonatal

1. Meconium stained amniotic fluid
   a. Epidemiology
      i. Incidence
         1. May occur either in utero or intrapartum

conditions or emergencies.

2. Mostly in post-term and small-for-gestational-age newborns
ii. Morbidity/mortality
1. High mortality
2. Hypoxemia
3. Aspiration pneumonia
4. Pneumothorax
5. Pulmonary hypertension
iii. Risk factors
1. Fetal distress during labor an delivery
2. Post-term newborns
3. Thin particulate meconium versus thick
b. Anatomy and physiology review
c. Pathophysiology
i. Hypoxia or physiologic cause
ii. Aspiration of meconium-stained amniotic fluid
1. Complete airway obstruction
a. Atelectasis
b. Right-to-left shunt across the foramen ovale
2. Incomplete airway obstruction
a. Ball valve type obstruction
b. Developing pneumothorax
c. Chemical pneumonitis
iii. Patient deterioration
1. Hypoxia
2. Hypercapnia
3. Acidosis
d. Assessment findings
i. Thin and watery
ii. Thick and particulate
e. Management considerations for think or particulate meconium
i. Airway and ventilation
1. Do not stimulate the newborn to breathe
2. Tracheal suction under direct visualization
a. Airway is clear
b. Newborn breathes on own
c. Bradycardia
3. Ventilate with 100% oxygen
ii. Circulation
iii. Pharmacological
iv. Non-pharmacological
1. Needle decompression may be required
2. Hypothermia prevention
v. Transport consideration – Identify facility to handle high-risk newborn
vi. Psychological support/communication strategies
1. Do not discuss "chances of survival" with family
2. Explain what is being done for the newborn
2. Apnea in the newborn
a. Epidemiology
i. Incidence
ii. Morbidity/mortality
iii. Risk factors
1. Prematurity

2. In newborn, prolonged or difficult labor and delivery
3. Drug exposure
4. Maternal infection

b. Anatomy and physiology review
c. Pathophysiology
   i. Usually due to hypoxia or hypothermia
   ii. May be due to other causes
      1. Narcotics or central nervous system depressant
      2. Airway and respiratory muscle weakness
      3. Oxyhemoglobin dissociation curve shift
      4. Septicemia
      5. Metabolic disorder
      6. Central nervous system disorders
d. Assessment findings
   i. Failure to breathe spontaneously after stimulation
   ii. Respiratory pauses greater than 20 seconds
e. Management considerations
   i. Airway and ventilation
      1. Stimulate the newborn to breathe
         a. Flicking the soles of the feet
         b. Rubbing the back
      2. Ventilate with BVM
         a. Disable pop-off valve
         b. Subsequent ventilations with minimal pressure to cause chest rise
      3. Suction as needed
      4. Intubation
         a. Indications
            i. Heart rate less than 60 with adequate BVM ventilation and chest compressions
            ii. Prolonged positive-pressure ventilations
            iii. Prolonged apnea
            iv. Central cyanosis despite adequate ventilations
            v. Craniofacial defects that impede airway control/maintenance
         b. Complications
            i. Tube dislodgement
            ii. Tube occlusion by mucous or meconium
            iii. Pneumothorax
            iv. Use of LMA as alternative means of airway control
   ii. Circulation
      1. Monitor heart rate continuously
      2. Circulatory access
         a. Peripheral IV
         b. Intraosseous
   iii. Pharmacological
      1. Consider narcotic antagonists if narcotic administered within four hours of delivery
      2. No narcotic antagonist should be utilized if mother is a drug abuser
      3. Consider dextrose (D10) administration if hypoglycemic

4. Consider fluid bolus
iv. Non-pharmacological
v. Transport consideration
vi. Psychological support/communication strategies
1. Relatively good outcome if treated early and aggressively
2. Explain what is being done for the newborn

3. Diaphragmatic hernia in the neonate
a. Epidemiology
i. Incidence
ii. Morbidity/mortality
iii. Risk factors
b. Anatomy and physiology review
c. Pathophysiology
i. Abdominal contents are displaced into the thorax
ii. Heart may be displaced
d. Assessment findings
i. Little to severe distress
ii. May have cyanosis unresponsive to ventilations
1. May be difficult to ventilate at "normal" airway pressures
2. May have associated hypoplastic lung on involved side
3. If significant prenatal shift in mediastinum, may have some degree pulmonary hypoplasia on contralateral side
iii. Scaphoid (flat) abdomen
iv. Bowel sounds heard in chest
v. Heart sounds displaced to right
e. Management considerations
i. Airway and ventilation
1. Assure adequate oxygen
2. Place an orogastric tube and apply low, intermittent suction
3. Endotracheal intubation may be necessary
4. Exercise caution if needle decompression
ii. Circulation (monitor heart rate continuously)
iii. Pharmacological (none indicated for primary problem)
iv. Non-pharmacological (surgical repair required)
v. Transport consideration (identify facility to handle high-risk newborn)
vi. Psychological support/communication strategies

4. Bradycardia in the neonate
a. Epidemiology
i. Incidence
1. Most commonly caused by hypoxia
2. Increased intracranial pressure
3. Hypothyroidism
4. Acidosis
5. Congenital AV node block in neonate of mothers with lupus
ii. Morbidity/mortality
1. Minimal risk if hypoxia is corrected quickly
2. Risk level relative to underlying causation if not

due to hypoxia
iii. Risk factors
1. Treatment via pharmacological measures alone
2. Prolonged suction or airway instrumentation
3. Vagal stimulation from inadequately secured ETT movements
4. Vagal effect of ventilation not synchronized to respiratory effort
b. Anatomy and physiology review
c. Pathophysiology (primarily caused by hypoxia)
d. Assessment findings
i. Assess upper airway for obstruction
1. Secretions
2. Tongue and soft tissue positioning
3. Foreign body
ii. Assess patient for hypoventilation
iii. Palpate umbilical stump or brachial artery
e. Management considerations
i. Airway and ventilation
1. Suction
2. Positive pressure ventilation with 100% oxygen
3. Endotracheal intubation
ii. Circulation
1. Heart rate less than 100 (BVM ventilation with 100% oxygen and reassess)
2. Heart rate less than 60 (begin chest compressions)
3. Heart rate between 60 and 80, but not responding to assisted ventilations with BVM (being chest compressions)
4. Discontinue chest compressions when heart rate reaches 100
iii. Pharmacological (epinephrine)
iv. Non-pharmacological (maintain temperature)
v. Transport consideration (identify facility to hand high-risk newborn)
vi. Psychological support/communication strategies
5. Premature births
a. Epidemiology
i. Incidence
1. Born prior to 37 weeks gestation
2. Weight ranges from 0.6 to 2.2 kg
3. Often related to comorbidity
a. Trauma
b. Neonatal sepsis
c. Maternal infection
i. UTI
ii. Chorioamnionitis
iii. Illness resulting in dehydration
d. Congenital anomalities
i. Genetic disorders
ii. Congenital malformations
1. Congenital heart defect
2. Spina bifida
iii. Placental insufficiency

iv. Oligohydramnios
v. Polyhydramnios
e. Previous premature deliveries
i. Incompetent cervix
ii. Relative large fetal size
f. Multiple gestation
g. Eclampsia
i. Pre-eclampsia
ii. Pregnancy induced hypertension
ii. Morbidity/mortality
1. Healthy premature infants weighing greater than 1,700 grams have a survivability and outcome approximately that of full-term infants
2. Respiratory suppression
3. Hypothermia risk
4. Head/brain injury
a. Hypoxemia
b. Change in blood pressure
c. Intraventricular hemorrhage
d. Fluctuations in serum osmolarity
iii. Risk factors
b. Anatomy and physiology review
c. Pathophysiology (retinopathy of prematurity)
i. Result of long term oxygen use
ii. Extreme prematurity
iii. Should not be a factor in short term management
iv. Hypoxemia causes irreparable brain damage
d. Assessment findings
i. Degree of immaturity determines the physical characteristics
1. Maternal dates
a. Ultrasound exam
b. Calculated expected date of confinement ("EDC")
2. Dubowitz scale
3. Size for gestational age
ii. Generally a large trunk and short extremities
iii. Skin is transparent and less wrinkles
iv. Less subcutaneous fat
e. Management considerations
i. Attempt resuscitation if the newborn has any sign of life
ii. Airway and ventilation
1. Suction
2. Assure adequate oxygenation
iii. Circulation (chest compressions if indicated)
iv. Pharmacological (epinephrine)
v. Non-pharmacological (maintain body temperature)
vi. Transport consideration (transport to a facility with special services for low birth weight newborns)
vii. Psychological support/communication strategies
6. Respiratory distress/cyanosis in the neonate
a. Epidemiology
i. Incidence
1. Prematurity is the single most common factor

2. Occurs most frequently in newborns less than 1,200 grams and 30 weeks gestation
3. Multiple gestations increase risk
4. Prenatal maternal complications increase risk

ii. Morbidity/mortality
1. Premature newborns have an immature central respiratory control center
2. Easily affected by environmental or metabolic changes

iii. Risk factors

b. Anatomy and physiology review – Fetal versus neonatal circulation
i. Closure of ductus arteriosus
ii. Ductal dependent lesions

c. Pathophysiology
i. Lung or heart disease
ii. Primary pulmonary hypertension
iii. CNS disorders
iv. Mucus obstruction of nasal passages
v. Spontaneous pneumothorax
vi. Meconium aspiration
vii. Amniotic fluid aspiration
viii. Lung immaturity
ix. Pneumonia
x. Shock and sepsis
xi. Metabolic acidosis
xii. Diaphragmatic hernia
xiii. Tracheoesophageal fistula
xiv. Can lead to cardiac arrest

d. Assessment findings
i. Tachypnea
ii. Paradoxical breathing
iii. Periodic breathing
iv. Intercostal retractions
v. Nasal flaring
vi. Expiratory grunt
vii. Choking/gagging/cyanosis with feeding

e. Management considerations
i. Airway and ventilation
ii. Circulation
iii. Pharmacological
iv. Non-pharmacological (maintain normal body temperature)
v. Transport consideration
vi. Psychological support/communication strategies

7. Seizures in the neonate
a. Epidemiology
i. Incidence (occur in a very small percentage of all newborns)
ii. Morbidity/mortality (represent relative medical emergencies as they are usually a sign of an underlying abnormality)
iii. Risk factors (prolonged and frequent multiple seizures may result in metabolic changes and cardiopulmonary difficulties)

b. Anatomy and Physiology review – Degree of myelinization will affect manner of seizure presentation/observed clinical signs
c. Pathophysiology
    i. Types of seizures
        1. Subtle seizure
            a. Eye deviation
            b. Blinking
            c. Sucking
            d. Swimming movements of the arms
            e. Pedaling movements of the legs
            f. Apnea
        2. Tonic seizure
            a. Tonic extension of the limbs
            b. Less commonly, flexion of the upper extremities and extension of the lower extremities
            c. More common in premature infants, especially in those with intraventricular hemorrhage
        3. Multi-focal seizure
            a. Clonic activity in one extremity
            b. Randomly migrates to another area of the body
            c. Occur primarily in full-term infants
        4. Focal clonic seizure
            a. Clonic localized jerking
            b. Occur in both full-term and premature infants
        5. Myoclonic seizure
            a. Flexion jerks of the upper or lower extremities
            b. May occur singly or in a series of repetitive jerks
    ii. Causes
        1. Hypoglycemia
        2. Other
            a. Hypoxic-ischemic encephalopathy
            b. Intracranial hemorrhage
            c. Metabolic disturbances
            d. Meningitis or encephalopathy
            e. Developmental abnormalities
            f. Drug withdrawal
        3. Seizure imitators
            a. Gastro esophageal reflux disease (“GERD”)
            b. Choking episode
            c. Tremors
            d. Myoclonic jerks
d. Assessment findings
    i. Decreased level of consciousness
    ii. Seizure activity
    iii. Apnea/bradycardia
e. Management considerations
    i. Airway and ventilation
    ii. Circulation
    iii. Pharmacological

1. Consider D10 for hypoglycemia
2. Consider anticonvulsant
3. Consider benzodiazepine for status epilepticus

iv. Non-pharmacological (maintain normal body temperature)
v. Transport considerations (identify facility to handle high-risk newborn)
vi. Psychological support/communication strategies

8. Fever in the neonate
   a. Epidemiology
      i. Incidence
         1. Rectal temperature ≥ 100.4° F (38.0° C)
         2. Average normal temperature (99.5° F, 37.5° C)
      ii. Morbidity/mortality
         1. Limited ability to control body temperature
         2. Limited ability to respond to infection
      iii. Risk factors
         1. Dehydration may contribute ot hyperthermia
         2. Material infection prior to delivery
   b. Anatomy and physiology review
   c. Pathophysiology
      i. Dehydration may contribute to hyperthermia
      ii. Material infection prior to delivery
   d. Assessment findings
      i. Mental status changes (irritability/somnolence)
      ii. Decreased intake
      iii. Caretaker history
      iv. Feels warm
      v. Observe patient for rashes, petechial
      vi. Term newborns will produce beads of sweat on their brow, but not over the rest of their body
      vii. Premature newborns will have no visible sweat
      viii. Increased work of breathing
      ix. Apnea
      x. Decreased perfusion/capillary refill prolonged
      xi. Mottled appearance
   e. Management considerations
      i. Airway and ventilation
      ii. Circulation
      iii. Pharmacological (administration of antipyretic agent is questionable in the prehospital setting)
      iv. Non-pharmacological
      v. Transport consideration
      vi. Psychological support/communication strategies
9. Hypothermia in the neonate
   a. Epidemiology
      i. Incidence (body temperature drops below 35° C)
      ii. Morbidity/mortality (newborns may die of cold exposure at temperatures adults find comfortable)
      iii. Risk factors (need to be controlled)
         1. Evaporation
         2. Conduction
         3. Convection
         4. Radiation
   b. Anatomy and physiology review

c. Pathophysiology (increased surface-to-volume relation makes neonates extremely sensitive to environmental conditions, especially when wet after delivery)
    i. Can be an indicator of sepsis in the neonate
    ii. Increased metabolic demand can cause metabolic acidosis, pulmonary hypertension, and hypoxemia
d. Assessment findings
    i. Pale color
    ii. Cool to touch, particular in extremities
    iii. Cyanosis of the extremities
    iv. Respiratory distress
    v. Apnea
    vi. Bradycardia
    vii. Central cyanosis
    viii. Irritability initially
    ix. Lethargy in late stage
    x. Generally do not shiver
e. Management considerations
    i. Airway and ventilation
    ii. Circulation
    iii. Pharmacological
        1. D10 if hypoglycemic
        2. Warm IV fluids
    iv. Non-pharmacological
        1. Environmental conditions should be 24° C to 26.5° C
        2. Warm hands prior to touching patient
    v. Transport considerations (identify facility to handle high-risk neonate)
    vi. Psychological support/communication strategies

10. Hypoglycemia in the neonate
a. Epidemiology
    i. Incidence
        1. Blood glucose concentration should be determined on all sick neonates
        2. May be due to inadequate glucose intake or increased utilization of glucose
    ii. Morbidity/mortality
    iii. Risk factors
        1. Asphyxia
        2. Toxemia
        3. Smaller twin
        4. CNS hemorrhage
        5. Sepsis
        6. Neonate of diabetic mother
        7. Large or small for gestational age
b. Anatomy and physiology review
c. Pathophysiology
    i. A blood glucose screening test less that 45 mg/dl indicates hypoglycemia
    ii. Glycogen stores are sufficient to meet glucose requirements for eight to 12 hours
    iii. Body released counter-regulatory hormones, including glucagon, epinephrine, cortisol, and growth hormone

iv. Hormones may cause symptoms of hyperglycemia that last for several hours
v. Increased fetal insulin level due to maternal hyperglycemia

d. Assessment findings
i. Twitching or seizures
ii. Limpness
iii. Lethargy
iv. Poor feeding
v. Decreased suck
vi. Eye-rolling
vii. High-pitched cry
viii. Apnea
ix. Irregular respirations
x. Cyanosis

e. Management considerations
i. Airway and ventilation
ii. Circulation
iii. Pharmacological (administer D10)
iv. Non-pharmacological (maintain normal body temperature)
v. Transport considerations (identify facility to handle high-risk neonate)
vi. Psychological support/communication strategies

11. Vomiting in the neonate
a. Epidemiology
i. Incidence
1. Persistent vomiting is a warning sign
2. Vomiting mucus, occasionally blood-streaked, in the first few hours of life is not uncommon
ii. Morbidity/mortality
1. Vomiting in the first 24 hours of life suggests obstruction in the upper digestive tract or increased intracranial pressure
2. Vomitus containing dark blood is usually a sing of a life-threatening illness
3. Bilious vomiting indicative of obstruction in proximal portion of duodenum
a. Malrotation with volvulus
b. Jejeunal atresia
iii. Risk factors
1. Aspiration or vomitus can cause respiratory insufficiencies or obstruction of the airway
2. Fluid and electrolyte imbalances due to vomiting
a. Dehydration
b. Hyponatremia
c. Hypokalemia
d. Hypochloremic metabolic alkalosis

b. Anatomy and physiology review
c. Pathophysiology
i. Vomiting of non-bile-stained fluid
1. Anatomic or functional obstruction at or above the first portion of the duodenum
2. Gastroesophageal reflux
ii. Vomiting of bile-stained fluid

d. Assessment findings
   i. Distended stomach
   ii. Infection
   iii. Icnreased ICP
   iv. Drug withdrawal
   v. Temperature instability
   vi. Apnea/bradycardia
   vii. Abdominal tenderness/guarding/rebound
   viii. High-pitched or absent bowel sounds
e. Management considerations
   i. Airway and ventilation
      1. Maintain a patent airway
      2. Suction/clear vomitus from airway
      3. Assure adequate oxygenation
   ii. Circulation (bradycardia may be caused by vagal stimulus)
   iii. Pharmacological (fluid administration may be required)
   iv. Non-pharmacological
      1. Provide supportive measures
      2. Consider nasogastric or orogastric tube to decompress stomach/reduce emesis or vagal effects of distension
   v. Transport considerations
      1. Place neonate on side
      2. Identify facility to handle high-risk neonate
   vi. Psychological support/communication strategies – Explain what is being done for the neonate

12. Diarrhea in the neonate
a. Epidemiology
   i. Incidence
   ii. Morbidity/mortality
      1. Severe cases can cause dehydration
      2. Bacterial or viral infection may be involved
   iii. Risk factors
b. Anatomy and physiology review
c. Pathophysiology
   i. Gastroenteritis
   ii. Necrotizing enterocolitis
   iii. Lactose intolerance
   iv. Phototherapy
   v. Neonatal abstinence syndrome
   vi. Thyrotoxicosis
   vii. Cystic fibrosis
   viii. Allergic process
d. Assessment findings
   i. Loose stools
   ii. Decreased urinary output
   iii. Signs of dehydration
e. Management considerations
   i. Airway and ventilation
   ii. Circulation
   iii. Pharmacological (fluid therapy may be indicated)
   iv. Transport considerations (identify facility to handle high-risk newborn)

v. Psychological support/communication strategies

13. Common birth injuries in the newborn
    a. Epidemiology
        i. Incidence
        ii. Morbidity/mortality
            1. Birth trauma
            2. Anoxic injuries
        iii. Risk factors
            1. Precipitous delivery
            2. Shoulder dystocia
            3. Breech delivery
    b. Anatomy and physiology review
    c. Pathophysiology
        i. Cranial injuries
            1. Molding of the head and overriding of the parietal bones
            2. Erythema, abrasions, ecchymosis, and subcutaneous fat necrosis can occur with forceps delivery
            3. Subconjuctival and retinal hemorrhage
            4. Subperiosteal hemorrhage
            5. Fracture of the skull
        ii. Intracranial hemorrhage
        iii. Spine and spinal cord (spinal cord injury without radiological abnormality ["SCIWORA"])
        iv. Peripheral nerve injury
            1. Brachial plexus
            2. Sciatic nerve
            3. Peroneal nerve
        v. Liver contusion or rupture
        vi. Rupture of the spleen
        vii. Adrenal hemorrhage
        viii. Fracture
            1. Clavicle
            2. Extremities
        ix. Hypoxia-ischemia
        x. Umbilical cord tear
    d. Assessment findings
        i. Diffuse, sometimes ecchymotic, edematous swelling of the soft tissues of the scalp
        ii. Paralysis below the level of spinal cord injury
        iii. Paralysis of the upper arm with or without paralysis of the forearm
        iv. Diaphragmatic paralysis
        v. Movement on only one side of the face when the newborn cries
        vi. Does not move arm freely on side o fracture clavicle
        vii. Lack of spontaneous movement of the affected extremity
        viii. Hypoxia
        ix. Shock
        x. Hemorrhage
    e. Management considerations
        i. Airway and ventilation
        ii. Circulation

	iii. Pharmacology iv. Non-pharmacological v. Transport consideration (identify facility to handle high-risk newborn) vi. Psychological support/communication strategies

13.3 – Pediatrics

Objective	Educational Standard
13.3.1 – Pediatric Anatomical Variations and Assessment	
C 13.3.1.1 – Differentiate the anatomical differences between the pediatric and adult head.	1. Compared to the body, the head is proportionally larger in size 2. The head contributes a larger portion of the body's surface area than in adults 3. Anterior and posterior fontanelles open a. Anterior closes by one year b. Posterior closes by three to four months 4. Implications for the health care provider a. Higher proportion of blunt trauma involves the head b. Cover an infant's head to prevent excessive heat loss c. Properly placing an infant in "sniffing position" to open the airway may require a towel or roll under the shoulders d. Examine fontanelle in infants i. Bulging fontanelle in an ill-appearing non-crying infant suggests increased intracranial pressure ii. Sunken fontanelle in an ill-appearing infant suggests dehydration
C 13.3.1.2 – Differentiate the anatomical differences between the pediatric and adult airway.	1. Much smaller in diameter and shorter in length 2. Infant's tongues take up more room in the oropharynx 3. The jaw is proportionally smaller 4. Infants are nasal breathers 5. The vocal cords are higher (C2/C3) and more anterior 6. In children younger than 10 years, narrowest part of the airway is below the vocal cords at the non-distensible cricoid cartilage 7. Tracheal cartilage is softer and more collapsible 8. The epiglottis in infants and toddlers is long, floppy, narrow, and extends at a 45° angle into the airway 9. Implications for the health care provider a. Suctioning to clear the nares of infants in respiratory distress cannot be overemphasized b. Smaller airways are more easily obstructed by: i. Flexion or hyperextension ii. Particulate matter iii. Soft tissue swelling (injury, inflammation) c. Posterior displacement of the tongue may cause airway obstruction d. Differences in intubation technique i. More delicate tissues are require a gentler touch ii. Straight blades are more useful for direct visualization of the cords iii. Actually lifting the large, floppy epiglottis with the end of a straight laryngoscope blade will help expose vocal cords iv. Because the narrowest part of the airway is below the vocal cords in children younger than 10 years, uncuffed tubes are used v. Appropriate endotracheal tube selection is

	estimated based upon age vi. Securing the endotracheal tube at the appropriate depth is crucial since changes in even one centimeter can mean a right mainstem intubation or unplanned extubation
C 13.3.1.3 – Differentiate the anatomical differences between the pediatric and adult chest and lungs.	1. Ribs are more cartilaginous and pliable 2. Less overlying muscle and fat to protect ribs and vital organs 3. Young children breathe primarily with their diaphragms; their chest muscles are immature and fatigue easily 4. Lung tissue is more fragile 5. Mediastinum (the heart and major vessels) is more mobile within the chest 6. Thin chest wall allows for easily transmitted breath sounds 7. Implications for the health care provider a. Infants and children are dependent on effective diaphragmatic excursion for adequate ventilation; a distended abdomen may not allow for this b. Rib fractures are less common; but when present represent a significant force generally accompanied by multi-system injury c. The elastic thorax may result in significant underlying organ injury despite a fairly normal appearing external exam d. Pulmonary contusions are more common e. Lungs are more prone to pneumothorax from excessive pressures while bag-mask ventilating f. Mobility of mediastinal structures makes children more sensitive to tension pneumothorax and flail chest g. Pneumothraces and esophageal intubations are often missed due to the ease with which breath sounds are transmitted all over the thorax through the thin chest wall
C 13.3.1.4 – Differentiate the anatomical differences between the pediatric and adult abdomen.	1. Less developed abdominal muscles offer less protection 2. Abdominal organs are situated more anteriorly and are less protected by ribs 3. Liver and spleen are proportionally larger 4. Implications for the health care provider a. Seemingly insignificant forces can cause serious internal injury; therefore, abdominal pain after trauma should be taken seriously b. Liver, spleen, and kidneys are more frequently injured c. Multiple organs injured more commonly
C 13.3.1.5 – Differentiate the anatomical differences between the pediatric and adult extremities.	1. Bones are softer 2. Injuries to the growth plates of long bones may result in poor bone growth 3. Open growth plates are weaker than ligaments and tendons 4. Growth plates generally disappear two years after their have their first periods; in boys, it is usually my mid to late high school

	5. Implications for the health care provider a. Immobilize any "sprain" or "strain" as it is more likely a fracture b. Angle slightly away from the growth plate when inserting an intraosseous needle
C 13.3.1.6 – Differentiate the anatomical differences between the pediatric and adult skin and body surface area.	1. Thinner with less subcutaneous fat 2. Larger surface area to body mass 3. Implications for the health care provider a. Skin is more easily, quickly, and deeply burned b. Larger surface area means larger losses of fluid and heat c. Be diligent about preventing core hypothermia (even in a burn patient) d. Hypothermia can limit resuscitative efforts and interfere with the body's ability to clot properly
C 13.3.1.7 – Differentiate the anatomical differences between the pediatric and adult respiratory system.	1. Tidal volume of breaths is smaller (10 to 15 mL/kg) 2. Higher oxygen demand per kilogram of body weight (two times that of an adult) 3. Smaller lung oxygen reserves 4. Implications for the health care provider a. Higher oxygen demand with less reserves means that hypoxia develops rapidly with apnea or ineffective bagging b. When ventilating a pediatric patient, the bag should have no less than 450 to 500 mL volume c. Err on using a larger bag for ventilating the pediatric patient; regardless of the size of the bag used for ventilation, one should only use enough force to make the chest rise slightly to limit pneumothorax d. Higher oxygen demand and metabolic rate mean that infants and children generally become symptomatic from inhaled toxic exposures prior to adults
C 13.3.1.8 – Differentiate the anatomical differences between the pediatric and adult nervous system and spinal column.	1. Continually evolves throughout childhood allowing them to develop new abilities 2. Brain tissue is more fragile and prone to bleeding from injury 3. The subarachnoid space is relatively smaller offering less cushioning to the brain 4. The brain requires nearly twice the cerebral blood flow as does an adult's 5. Brain and spinal cord are less well-protected by a thinner skull and spinal column 6. Spinal column a. The ligaments and joint capsules of the vertebrae are more flexible b. Vertebral bodies are wedged anteriorly and can slide forward with flexion 7. Implications for the health care provider a. The large cerebral blood flow requirement makes children with head injuries extremely susceptible to hypoxia; hypoxia and hypotension in a child with a head injury can cause ongoing damage as bad as the initial injury itself b. Less cushioning by the subarachnoid space means

	that head momentum is more likely to result in bruising and damage to the brain c. Through spinal cord injuries are less common in pediatrics, they more frequently occur with normal appearing x-rays; this phenomenon is referred to as SCIWORA (spinal cord injury without radiographic abnormalities) d. Cervical spine injuries, when present, are more commonly ligamentous injuries rather than secondary to broken vertebrae e. Since the weaker neck supports a relatively heavier head and, therefore, flexes more easily with trauma, cervical spine injuries sustained are usually higher (C1 to C3) f. When in doubt about the presence of a cervical spine injury, assume the worst and maintain immobilization of the child's head and neck
C 13.3.1.9 – Differentiate the metabolic differences between a pediatric and adult patient.	1. Infants and children have limited glucose stores 2. Infants and children are prone to hypothermia due to increased body surface area 3. Newborns and infants less than one month are the most susceptible to hypothermia 4. Implications for the health care provider a. Keep the infant or child warm during treatment and transport b. Make sure to cover the head (not the face, though) to minimize heat loss c. Have a very low threshold for checking blood glucose levels, especially in children who are having a seizure or are lethargic on your exam d. Newborns particularly need to be kept warm; hypothermia is a "killer" and can predispose them to spontaneous head bleeds e. However, newborns who are requiring a difficult, prolonged resuscitation after delivery, should not be overwarmed, as this can worsen their neurologic outcome
13.3.2 – Growth and Development	
C 13.3.2.1 – Discuss the physical, cognitive, and emotional development of infants.	1. Birth to two months a. Physical development i. Begin to better control gazing at faces, turning their heads, and sucking ii. Sleep accounts for up to 16 hours a day; only half of that is at night iii. Infants have a relatively large surface area, which predisposes them to hypothermia b. Cognitive development i. Crying is the only way infants communicate ii. Crying peaks at six weeks to three hours a day; by three months it drops to one hour iii. Infants cry for obvious reasons, such as hunger and needing to be changed iv. When obvious reasons for crying have been addressed, persistent crying can be a sign of

significant illness
c. Emotional development
i. Trust develops as infants learn that parents take care of their urgent needs
ii. Infants of this age whose crying is responded to timely by parents have been shown to cry less at one year and have decreased aggression at two
d. Implications for the healthcare provider
i. Persistent crying or irritability in a birth to two month old can be a symptom of serious bacterial infections such has meningitis, supraventricular tachycardia (SVT), physical abuse, intussusception, cardiac problems, corneal abrasions, or electrolyte disturbances
ii. Though infants sleep a lot, they should be arousable; inability to arouse an infant should be considered an emergency
iii. Be diligent about keeping infants warm and dry to limit hypothermia
iv. Infants do not develop head control until closer to six months, so when handling an infant, make sure to support head and neck well
v. This is a particularly stressful time for parents adjusting to the eating, sleeping, and crying cycle; sometimes this is complicated by post-partum depression too, which can be a risk factor for abuse

2. Two to six months
a. Physical development
i. Begin voluntarily smiling and increasing eye contact
ii. Both hands begin to be used to examine objects
iii. 70% of babies sleep through the night by six months
iv. Intentional rolling over begins
v. Begin to old their heads up
b. Cognitive development
i. Increased awareness of what is going on around them
ii. Begin to explore their own bodies
c. Emotional development
i. Develop distinctive facial expressions of joy, anger, fear, surprise, etc.
ii. Begin actively seeking attention
d. Implications for the health care provider
i. Persistent crying or irritability can be a symptom of serious bacterial infections such as meningitis, SVT, physical abuse, intussusception, cardiac problems, corneal abrasions, or electrolyte disturbances
ii. Infants do not typically roll until around three to four months; a history of an infant less than that rolling himself/herself off of a bed or table and sustaining major injuries may indicate abuse
iii. Infants of this age begin to identify and respond

	to facial expressions; approach them with a smile or funny face and a happy, soft spoken voice iv. By six months, infants should make eye contact; no eye contact in a sick infant could be a sign of significant illness or depressed mental state 3. Six to 12 months a. Physical development i. Begin to sit without support ii. Develop a pincer grasp; everything goes to the mouth iii. Begin to crawl iv. Begin developing teeth and eating soft foods b. Cognitive development i. Begin babbling and, by 12 months, learn their first word ii. Develop "object consistency;" they do not forget that something exists just because you take it away iii. Interested in what objects do and what objects fit where c. Emotional development i. Development of "separation anxiety" from their parents and the start of tantrums ii. Sense of autonomy around feeding as they begin to eat finger foods d. Implications for the health care provider i. Persistent crying or irritability can be a symptom of serious bacterial infections such as meningitis, SVT, physical abuse, intussusception, cardiac problems, corneal abrasions, or electrolyte disturbances ii. Infants explore objects with their mouths, which greatly increases the risk of foreign body aspiration; do not give infants exam gloves to play with iii. Separation anxiety is best dealt with by keeping the infant and parent together as much as possible during evaluation and involving the parent in the treatment if appropriate; if possible, interact first with the parent to build trust with infant iv. With the increased mobility of crawling and walking comes exposure to physical dangers
C 13.3.2.2 – Discuss the physical, cognitive, and emotional development of toddlers.	1. 12 to 18 months a. Physical development b. Cognitive development i. Imitation of older children and parents ii. Make-believe play iii. Understand more than what they can express iv. Know major body parts v. Know four to six words c. Emotional development d. Implications for the health care provider i. Persistent crying or irritability can be a

symptom of serious bacterial infections such as meningitis, SVT, physical abuse, intussusception, cardiac problems, corneal abrasions, or electrolyte disturbances
ii. The front teeth come in before the molars, which means that toddlers may bit off large pieces of food and then not be able to grind them up before swallowing, increasing the risk of food aspiration; do not give toddlers exam gloves to play with
iii. Separation anxiety is best dealt with by keeping the toddler and parent together as much as possible during evaluation and involving the parent in the treatment if appropriate; if possible, interact first with the parent to build trust with the toddler
iv. With increased mobility comes exposure to physical dangers and injury
v. Talk to the toddler during the assessment even if the conversation is one-sided
vi. Distracting a toddler with a flashlight or toy may increase one's chances of obtaining a good physical examination

2. 18 to 24 months
   a. Physical development
      i. Improved gait and balance
      ii. Begin to run and climb
      iii. Head begins to grow more slowly than the body
   b. Cognitive development
      i. Begin to understand cause and effect
      ii. Start to use "tools"
      iii. Play with dolls
      iv. Begin to label objects
      v. 10 to 15 words becomes 100 by 24 months
   c. Emotional development
      i. Increasing clinginess with parents
      ii. Attachment to a special object, like a blanket
   d. Implications for the health care provider
      i. Persistent crying or irritability can be a symptom of serious bacterial infections such as meningitis, SVT, physical abuse, intussusception, cardiac problems, corneal abrasions, or electrolyte disturbances
      ii. The front teeth come in before the molars, which means that children may bite off large pieces of food and then not be able to grind them up before swallowing, increasing the risk of food aspiration; do not give children exam gloves to play with
      iii. Separation anxiety is best dealt with by keeping the child and parent together as much as possible during evaluation and involving the parent in the treatment if appropriate; if possible, interact first with

	the parent to build trust with the child iv. With increase mobility comes exposure to physical dangers and injury v. Talk to the child during the assessment even if the conversation is one-way vi. Distracting a child with a flashlight or toy may increase one's chances of obtaining a good physical examination vii. Allow a child to hold objects of importance to them, like a blanket, stuffed animal, or doll viii. With the head beginning to grow at a slower rate than the body, children begin to no longer require shoulder rolls limiting flexion of the neck when bag-valve-mask ventilating or intubating ix. As children begin to relate cause and effect, painful procedures make lasting impressions; be considerate by limiting painful procedures and adequately treating pain
C 13.3.2.3 – Discuss the physical, cognitive, and emotional development of preschoolers.	1. Two to five years 2. Physical development a. Bodies become leaner b. Develop 20/20 vision by age four c. Have all their teeth by three d. They perfect normal walking and running e. Begin throwing, catching, and kicking f. Generally establish left or right handedness g. Toilet training 3. Cognitive development a. Most rapid increase in language b. Magical thinking c. Rules tend to be absolute d. Irrational fears 4. Emotional development a. Learn what are acceptable behaviors b. Have tantrums around control issues c. Modesty develops 5. Implications for the health care provider a. Avoid procedures on the dominant hand or arm b. The rapid increase in language means they will understand much of what you say if simple terms are used c. Respect the patient's modesty and cover them up after the physical examination d. Foreign body airway obstruction risk continues to be high e. Offer choices to the patient if appropriate (i.e., listen to the front first or the back?) f. Do not waste time trying to use logic to convince preschoolers; they are concrete thinkers; avoid frightening or misleading comments g. Appealing to their magical thinking may allow you to do more (e.g., this magic smoke will help you breath

	better [nebulizer]) h. Preschoolers tend to hold rules true for all situations; if they have been told that no one should look at their privates, they will not understand why it is okay all of a sudden for the health care worker to do that
C 13.3.2.4 – Discuss the physical, cognitive, and emotional development during middle childhood.	1. Six to 12 years 2. Physical development 3. Cognitive development a. Begin to think logically b. Life centers around school 4. Emotional development a. Popularity and peer pressure become very important b. Children with chronic illness or disabilities begin to be very self-conscious c. Children begin to understand that death is final 5. Implications for the health care provider a. With patients loosing baby teeth and developing adult teeth, one must be particularly careful when intubating b. School-aged children understand simple explanations for illness and treatments c. Be honest about procedures that will cause them discomfort d. Give children some sense of control by giving choices if possible e. Reassure children that everything is going to be all right, if appropriate, and that they are not going to die f. Respect the child's modesty and cover them up after the physical examination g. Asking about school will often allow children to warm up to you faster
C 13.3.2.5 – Discuss the physical, cognitive, and emotional development of adolescents.	1. 12 to 20 years 2. Physical development (puberty begins) a. Girls first develop breasts around eight to 13 years; menstruation starts between nine and 16 b. Boys first develop increase in testicle size, which typically starts around ten 3. Cognitive development a. Acquire the ability to reason b. Do not see possibilities as real things that could happen to them c. Develop morals 4. Emotional development a. Self-conscious about body image b. Begin to understand who they are and begin to be comfortable with that c. Relationships generally transition from mostly same sex ones to those with the opposite sex 5. Implications for the healthcare provider a. Explain things clearly and honestly as you would to an adult b. Give the adolescent choices when appropriate c. Respect the adolescent's modesty and cover them up after the physical examination

	d. Be honest about procedures that will cause them discomfort e. Address adolescents' concerns and fears about the lasting effects of their injuries (especially cosmetic) and, if appropriate, reassure them that everything is going to be all right f. Adolescence is a the tumultuous effect of hormonal surges, emotions, and peer pressure; these place children at risk for substance abuse, self-endangerment, pregnancy, and dangerous sexual practices
13.3.3 – Pediatrics: Specific Pathophysiology, Assessment, and Management	
C 13.3.3.1 – Discuss the pathophysiology, assessment, and management of specific pediatric medical conditions or emergencies.	1. Respiratory compromise a. Introduction i. Epidemiology ii. Anatomic and physiologic differences in children b. Pathophysiology i. Respiratory distress ii. Respiratory failure iii. Respiratory arrest c. Assessment i. History (age, preceding symptoms, choking episode, underlying disease, sick contacts, prematurity) ii. Physical findings (mental status, respiratory rate, pulse oximetry, capnometry, work of breathing, color, heart rate, degree of aeration, presence of stridor or wheeze) d. Upper airway obstruction i. Croup ii. Foreign body aspiration iii. Bacterial tracheitis iv. Epiglottis v. Tracheostomy dysfunction e. Lower airway disease i. Asthma ii. Bronchiolitis (respiratory syncytial virus ["RSV"] is common cause) 1. Highly contagious 2. Most common in infants under one year 3. Infections usually occur epidemically in the winter f. Pneumonia g. Foreign body lower airway obstruction h. Pertussis i. Cystic fibrosis j. Bronchopulmonary dysplasia ("BPD") i. Chronic lung disease that usually occurs in infants born prematurely and treated with positive pressure ventilation and high oxygen concentrations ii. Recurrent respiratory infections and exercise

induced bronchospasm are complications
iii. Management
1. Airway positioning (chin lift, jaw thrust)
2. Airway adjuncts (nasopharyngeal and oropharyngeal airways)
3. Oxygen
4. Inhaled medications, bronchodilators (albuterol, ipratropium, racemic epinephrine)
5. Oral and intramuscular medications (prednisolone, dexamethasone), corticosteroids
6. Assisted ventilation (bag mask, CPAP, BiPAP, endotracheal intubation, cricothyroidotomy)

2. Non cardiogenic shock
a. Introduction
i. Epidemiology
ii. Anatomic and physiologic differences in children
b. Pathophysiology (compensated versus decompensated)
i. Hypovolemic
ii. Distributive (septic, neurogenic, anaphylactic)
c. Assessment
i. History (fever, vomiting, diarrhea, urine output, fluid intake, blood loss, allergic symptoms, burns, accidental ingestion)
ii. Physical findings (heart rate, blood pressure, capillary refill, color, petechiae, mental status, mucous membranes, skin turgor, face/lip/tongue swelling)
d. Management
i. Intravenous isotonic crystalloid for all types
ii. Septic (in-hospital antibiotics for presumed bacterial sepsis)
iii. Anaphylactic (subcutaneous epinephrine, intravenous anti-histamines [diphenhydramine, ranitidine], and intravenous steroids)
iv. Consider vasopressors for ongoing decompensated shock

3. Cardiac
a. Introduction
i. Epidemiology
ii. Anatomic and physiologic differences in children
b. Pathophysiology
i. Shock in children (compensated versus decompensated)
ii. Cardiogenic versus non-cardiogenic shock
c. Assessment
i. History (age, sweating while feeding, cyanotic episodes, difficult breathing, syncope, prior cardiac surgery, poor weight gain)
ii. Physical findings (heart rate, blood pressure, capillary refill, color, mental status, cardiac murmurs/rubs/gallops, pulse oximetry, four extremity blood pressures)

iii. Bedside testing (rhythm strip)
d. Congestive heart failure
i. Myocarditis
ii. Cardiomyopathy
iii. Congenital heart disease as underlying cause
e. Congenital heart disease
i. Cyanotic disease (brief overview)
1. Hypoplastic left heart syndrome ("HLHS")
2. Tricuspid atresia
3. Transposition of the great arteries ("TGA")
4. Tetralogy of Fallot ("ToF")
5. Total anomalous pulmonary venous return ("TAPVR")
6. Truncus arteriosus
ii. Noncyanotic disease (brief overview)
1. Coarctation of the aorta ("CoA")
2. Atrial septal defect ("ASD")
3. Ventricular septal defect ("VSD")
4. Patent ductus arteriosus ("PDA")
f. Arrhythmias
i. Fast pulse
1. Sinus tachycardia
2. Supraventricular tachycardia ("SVT")
3. Ventricular tachycardia, with a pulse
ii. Slow pulse
1. Sinus bradycardia
2. Second or third degree heart block
iii. Absent pulse
1. Asystole
2. Ventricular fibrillation/pulseless ventricular tachycardia
3. Pulseless electrical activity ("PEA")
g. Management
i. Congestive heart failure or congenital heart disease
1. Oxygen (caution with ductal dependent systemic flow due to pulmonary steal)
2. Use of prostaglandin for ductal dependent cardiac lesions
3. Use of furosemide diuretic for fluid overload
4. Cautious use of IV fluids if cardiogenic shock suspected
ii. Arrhythmias
iii. Vagal maneuvers for SVT (recommended versus unacceptable)
iv. Pharmacologic indications
v. Chest compressions
vi. Defibrillation, synchronized cardioversion, and transcutaneous pacing
vii. Interventions for other causes of PEA

4. Neurologic
a. Introduction
i. Epidemiology
ii. Anatomic and physiologic differences in children
b. Pathophysiology

i. Causes of altered mental status in children (trauma, toxins, infection, electrolyte or glycemic imbalance, intussusception, seizure, uremia, intracranial bleed, intracranial mass)
ii. Hydrocephalus
iii. Epidural and subdural hematomas
iv. Pathophysiology of seizures
v. Increased intracranial pressure and cerebral perfusion pressure

c. Assessment
i. History (age, fever, vomiting, photophobia, headache, prior seizures, extremity shaking, staring episodes, trauma, ataxia, ingestions, oral intake, bloody stool, urine output, baseline developmental level)
ii. Physical findings (vital signs, photophobia, nuchal rigidity, GCS, palpation of ventricular shunt, full neurologic examination)

d. Meningitis
e. Seizures
i. Afebrile
ii. Febrile
iii. Status epilepticus

f. Hydrocephalus
g. Closed head injury
i. Epidural hematoma
ii. Subdural hematoma
iii. Fractures

h. Ventricular shunts
i. Infection
ii. Malfunction

i. Management
i. Seizures
1. Oxygen for prevention of brain hypoxia
2. Benzodiazepines
3. Other antiepileptic drugs (fosphentyoin, phenobarbital, pentobarbital)

ii. Altered mental status
1. Assess for need to protect airway
2. Consider reversal agents for toxin ingestion
3. Assess and intervene for increased intracranial pressure

iii. Increased intracranial pressure
1. Medications for intubation (thiopental, etomidate, lidocaine, non-depolarizing muscle relaxants)
2. ICP lowering medications (benzodiazepines, barbiturates, mannitol)
3. Other ICP lowering techniques (mannitol, elevation of head, hyperventilation)

5. Endocrinology
a. Introduction
i. Epidemiology
ii. Anatomic and physiologic differences in children

b. Pathophysiology

i. Glucose metabolism
ii. Diabetic ketoacidosis and cerebral edema in children
iii. Cortisol deficiency

c. Assessment
i. History (polyuria, polydipsia, weight loss, visual changes, poor feeding, abnormal odors, growth delays)
ii. Physical findings (heart rate, blood pressure, mucous membranes, mental status, virilization, fontal bossing, blindness)
iii. Bedside testing (blood sugar)

d. Hyperglycemia

e. Hypoglycemia
i. Congenital adrenal hyperplasia
ii. Panhypopituitarism
iii. Inborn errors of metabolism

f. Management
i. Hyperglycemia
1. Cautious fluid resuscitation due to risk of cerebral edema
2. Insulin administration
ii. Hypoglycemia
1. Dextrose dosing in children
2. Use of D10 in children with metabolic disease
3. Administration of stress dose steroids for cortisol deficiency

6. Hematologic/Oncologic/Immunologic

a. Introduction
i. Epidemiology
ii. Anatomic and physiologic differences in children

b. Pathophysiology
i. Hemoglobin and disrupted oxygen carrying capacity
ii. Blood clotting (platelets, coagulation factors)
iii. Tumor lysis syndrome (basic overview)
iv. Immune dysfunction and infection risk

c. Assessment
i. History (chest pain, weakness, abdominal pain, extremity pain, trauma, bleeding, swollen joints, swollen gland, fever, bruising)
ii. Physical findings (all vital signs, lung sounds, extremity tenderness, signs of active bleeding, bruises, joint swelling)
iii. Bedside testing (blood sugar)
iv. Inspection of indwelling catheters for possible infection

d. Sickle cell disease
i. Acute chest syndrome
ii. Splenic sequestration
iii. Stroke
iv. Vaso-occlusive crises
v. Priapism

e. Bleeding disorders
i. Thrombocytopenia

ii. Hemophilia
iii. Von Willebrand's disease
f. Leukemia/lymphoma
g. Immunocompromised
i. Neutropenia
ii. Immunosuppressive medication
h. Management
i. Sickle cell disease
1. IV hydration (caution with fluid sensitivity)
2. Pain control with NSAIDs and opiates
ii. Bleeding disorders
1. Isotonic fluid resuscitation for blood loss
2. Maneuvers to control active bleeding
iii. Leukemia/lymphoma – Hydration with $NaHCO_3$ for possible tumor sysis syndrome
iv. Immunocompromise
1. Isotonic fluid resuscitation for possible sepsis
2. Antibiotics for possible sepsis

7. Gastrointestinal
a. Introduction
i. Epidemiology
ii. Anatomic and physiologic differences in children
b. Pathophysiology
i. Embryology of the GI tract
ii. Vomiting mechanism
iii. Electrolyte complications of gastroenteritis and pyloric stenosis
iv. GI bleeding
c. Assessment
i. History (blood or bile in emesis, diarrhea, age, gender, constipation, fever, medications, tolerance of gastrostomy tube feeds, prematurity, blood type incompatibility, epistaxis, liver disease)
ii. Physical findings (heart rate, blood pressure, mucous membranes, icterus, capillary refill, blood in nares, abdominal distention or mass, hepatomegaly, pallor, anal fissure)
iii. Inspection of gastrostomy tube
d. Vomiting
i. Gastroenteritis
ii. Malrotation
iii. Pyloric stenosis
e. GI bleeding
i. Upper GI bleed (swallowed maternal blood, Mallory-Weiss tear, swallowed nasopharyngeal blood, gastritis, gastric ulcer, esophageal varices)
ii. Lower GI bleed
iii. Neonatal (swallowed maternal blood, anal fissure, necrotizing enterocolitis, malrotation, Hyrschsprung's disease, coagulopathy)
1. Infants/toddlers (allergic colitis, infectious enteritis, intussusception, Meckel's diverticulum, GI duplication)

2. School age (infectious enteritis, juvenile polyps, hemolytic uremic syndrome, Henroch Schonlein purpura)
3. Adolescents (infectious diarrhea, juvenile polyps, inflammatory bowel disease)

iv. Gastrostomy tube dysfunction

f. Neonatal jaundice
i. Physiologic
ii. Pathologic

g. Management
i. Bowel rest (for vomiting and GI bleed)
ii. IV hydration
iii. Replacement of G-tube if dislodged or dysfunctional

8. Toxicologic
a. Introduction
i. Epidemiology
ii. Nontoxic exposures
iii. Role of the Poison Control Center

b. Assessment
i. History (time of ingestion/exposure, amount ingested, abnormal symptoms, bottles/containers available)
ii. Physical findings (all vitals, airway/breathing/circulation)

c. Ingestion
i. Specific toxidromes (anticholinergics, cholinergics, opiates, benzodiazepines, sympathomimetics, beta-blockers, calcium channel blockers, salicylate, tricyclic antidepressants)
ii. Caustic substances

d. Inhalation

e. Management
i. Decontamination
ii. Topical irrigation for skin and eye exposures
iii. Dilution
iv. Gastric emptying (no role for ipecac; indications for gastric lavage)
v. Inert binding (activated charcoal; single and multi-dose)
vi. Catharsis (sorbitol or magnesium citrate)
vii. Whole bowel irrigation
viii. Antidotes
ix. Diuresis (mannitol and sodium bicarbonate)
x. Dialysis and hemoperfusion
xi. Oxygen and bronchodilators for inhalation injuries

13.3.4 – Abuse and Neglect

C 13.3.4.1 – Discuss the assessment and management of a pediatric abuse and neglect patient.

1. Introduction
a. Epidemiology
b. Definitions of abuse (physical, emotional, sexual) and neglect
2. Assessment

	a. Elements in the history or scene concerning for abuse or neglect b. Assessing the caregiver's behavior c. Physical findings concerning for abuse or neglect d. Benign findings often confused for physical or sexual abuse 3. Management a. Role of the prehospital professional (scene assessment, assessment of the caregiver, communication with the caregiver, documentation, reporting suspected abuse/neglect, safely transporting one or more injured children) b. Role of Child Protective Services ("CPS") c. Role of Medical Examiner and law enforcement
13.3.5 – Sudden Infant Death Syndrome	
C 13.3.5.1 – Discuss the risk factors, assessment, and management of a sudden infant death syndrome casualty.	1. Introduction a. Definition of SIDS b. Definition of ALTE c. Epidemiology and risk factors 2. Assessment a. Cardiopulmonary status b. Clinical signs of death c. Evaluation for other signs of abuse 3. Management a. Local EMS criteria for death in the field b. Notification of appropriate authorities c. Controversy over transport after failed advanced life support d. Caregiver support

13.4 – Geriatrics

Objective	Educational Standard
13.4.1 – Normal and Abnormal Changes Associated with Aging	
C 13.4.1.1 – Discuss normal and abnormal changes associated with aging.	1. Normal changes associated with aging primarily occur due to deterioration of organ system 2. Pathological changes in the elderly are sometimes difficult to discern from normal aging changes 3. Cardiovascular a. Inability to tolerate cardiovascular dysfunction of any kind b. Inability to increase rate and cardiac output c. Degeneration of valves d. Degeneration of conduction system e. More likely to have dysrhythmias f. Stroke volume decreases g. Vessel walls lose elasticity and are less flexible 4. Respiratory a. Loss of elastic recoil in the chest wall b. Diminished respiratory muscle strength and endurance c. Loss of alveoli d. Reduction in oxygen and carbon dioxide exchange e. Inability to increase rate of respiratory effort f. Decreased cough reflex g. Decreased ability of cilia to move mucus upward 5. Neurovascular a. Atrophy of the brain tissue i. Cognitive and short-term memory effects ii. Delayed verbal response b. Deterioration of the nervous system function in controlling: i. Rate and depth of breathing ii. Heart rate iii. Blood pressure iv. Hunger and thirst v. Temperature vi. Sensory perception (including audio, visual, olfactory, touch, and pain) c. Delayed reflexes and response times d. Impaired balance 6. Gastrointestinal a. Dental problems b. Decrease in saliva c. Poor sphincter muscle tone d. Heartburn and acid reflux e. Decrease in hydrochloric acid in the stomach f. Alterations in absorption of nutrients g. Slowing peristalsis causing constipation h. Rectal sphincter weakens with increased incidence of fecal incontinence i. Liver function decreases with increased potential for drug toxicity

	7. Genitourinary a. Reduction in renal function due to decreased blood flow and tubule degeneration b. Decreased bladder capacity c. Decline in sphincter muscle control causing incontinence d. Decline in voiding senses and nighttime voiding e. In males, benign prostatic hypertrophy 8. Endocrine a. Increase in incidence of diabetes b. Increase in secretion of antidiuretic hormone causing fluid imbalance c. Decreased production of estrogen causing osteoporosis 9. Musculoskeletal a. Atrophy of muscles b. Degenerative changes and loss of bone c. Loss of strength d. Degenerative changes in joints e. Loss of elasticity in ligaments and tendons f. Thinning of cartilage and thickening of synovial fluid 10. Integumentary a. Atrophy of the epidermis, hair follicles, and sweat glands b. Lessened skin turgor c. Tenting present even when patient is hydrated d. Nails become thin and brittle e. Increased healing time f. Pigment changes g. Decreased elasticity h. Hair loss i. Reduction of subcutaneous tissue j. Skin easily torn
13.4.2 – Sensory Changes	
C 13.4.2.1 – Discuss sensory changes in vision, hearing, and pain perception related to aging.	1. Vision a. Decreased visual acuity (inability to accommodate) b. Inability to differentiate colors c. Decreased night vision d. Decreased tear production e. Development of cataracts f. Disease processes i. Glaucoma ii. Macular degeneration iii. Retinal detachment 2. Hearing a. Presbycusis b. Inability to hear high frequency sounds c. Use of hearing aids 3. Pain perception (inability to differentiate hot from cold)
13.4.3 – Pharmacokinetic Change	
C 13.4.3.1 – Discuss physiological changes	1. Physiological changes that impact pharmacokinetics

of aging that impact pharmokinetics.	a. Decrease in amount of body water b. Decrease in muscle mass c. Increase in body fat d. Renal function deterioration e. Liver function deterioration f. Altered distribution of drugs 2. Implications of altered pharmacokinetics a. Increased drug sensitivity b. Increased adverse drug reactions c. Increased drug toxicity d. Dosages should possibly be decreased 3. Difficulty in compliance of drug therapy a. Lack of money to purchase b. Complicated drug regime c. Forgetfulness ("did I take it or not") d. Difficulty opening containers e. Directions for use not understood f. Other
13.4.4 – Polypharmacy	
C 13.4.4.1 – Discuss polypharmacy as related to aging.	1. Multiple chronic diseases means multiple medications 2. Drug dosages may not have been adjusted for multiple meds 3. Drug interactions may cause problems 4. Consider polypharmacy as a reason for problems
13.4.5 – Psychosocial and Economic Aspects	
C 13.4.5.1 – Discuss the psychosocial and economic aspects of aging in the United States.	1. Demographics and "graying of America" 2. Psychosocial issues a. Living environments b. Financial issues c. Social services
13.4.6 – Specific Conditions that Occur More Frequently in the Elderly	
C 13.4.6.1 – Discuss the pathophysiology and management of specific medical conditions or emergencies that occur more frequently in the elderly.	1. Myocardial infarction a. Patient will usually have atypical chest pain or no pain b. May present with only dyspnea, acute confusion (delirium), syncope, weakness, or nausea and vomiting 2. Congestive heart failure a. A frequent condition of the elderly b. May present with dyspnea, orthopnea, or mental status alteration c. Peripheral edema is frequently present in elderly patients with or without failure and may signify a variety of conditions d. Fluid balances are sometimes difficult to achieve 3. Aortic dissection 4. Syncope a. May have a variety of causes, usually cardiac or neurological b. Causes to consider: i. Vasopressor use

ii. Orthostatic hypotension
iii. Transient reduction in blood flow to the brain due to cardiac output drop for any reason
iv. TIA
v. Vasovagal syncope

5. Hypertension
6. Pneumonia
   a. Presentation can include dyspnea, congestion, altered mental status, or abdominal pain
   b. Fever may be absent
7. Pulmonary embolism
   a. Should be considered in any elderly patient with acute dyspnea
   b. Common after hip fracture
8. Asthma
9. Emphysema and chronic bronchitis
10. Stroke
11. Transient ischemic attacks ("TIA")
12. Alzheimer's disease
    a. Definition
       i. Stages
       ii. Diagnosis
       iii. Prognosis
    b. Epidemiology
       i. Population
       ii. Early onset
    c. Pathophysiology
       i. Plaques
       ii. Tangles
    d. Signs and symptoms
       i. Memory
       ii. Learning
       iii. Judgment
       iv. Language
       v. Tasks
    e. Personality changes
       i. Apathy
       ii. Irritability
       iii. Depression
       iv. Agitation
       v. Psychosis
    f. Normal day-to-day living
       i. Problems associated with management
       ii. Patient violence
       iii. Patient verbal abuse
       iv. Fearful patient
    g. Management
       i. Communication
       ii. Slow clear instructions
       iii. Distraction from agitation
       iv. Other
       v. Treat symptomatically
       vi. Consider co-illnesses
       vii. Consider medication reactions
    h. Alzheimer's treatment

i. Cholinesterase inhibitors
ii. Antipsychotics
iii. Antidepressants

13. Dementia
    a. Definition
    b. Causes of dementia
        i. Alzheimer's disease (most common form of dementia)
            1. Pathophysiology
            2. Stages
            3. Assessment and interactions
        ii. Multi-infarct dementia
        iii. Drug toxicity
        iv. Emotional disorders
        v. Metabolic and endocrine disorders
        vi. Brain tumor
        vii. Brain trauma
        viii. Infections
        ix. Major depression
        x. Parkinson's disease
        xi. Huntington's chorea
    c. Associated signs and symptoms
        i. Progressive loss of cognitive function; short and long-term memory problems
        ii. Loss of attention span
        iii. Loss of communication skills
        iv. Inability to perform daily routines
        v. Easily lost
        vi. Angers easily
    d. Problems associated with management of patient with dementia
        i. Poor historian; impaired judgment
        ii. Inability to vocalize areas of pain and current symptoms
        iii. Unable to follow commands
        iv. Anxiety over movement out of home or current establishment
        v. Anxiety and fear of treatment of current medical problems
14. Delirium (a sudden change in behavior, consciousness, or cognitive processes generally due to a reversible physical ailment)
    a. Mortality rates
    b. Evaluation of pathophysiology through history, possible risk factors, and current medications
        i. Intoxication or withdrawal from alcohol
        ii. Withdrawal from sedatives
        iii. Vitamin deficiencies
        iv. Urinary tract infections/bowel obstructions
        v. Cardiovascular disease
        vi. Hyper/hypoglycemia
        vii. Psychiatric disorders
        viii. Malnutrition
        ix. Dehydration
        x. Environmental emergencies

xi. Depression
xii. Fever
xiii. Current medications (anticholinergic medications)

c. Associated signs and symptoms
i. Onset of minutes, hours, days
ii. Disorganized thoughts (inattention, memory loss, disorientation)
iii. Hallucinations
iv. Delusions
v. Reduced level of consciousness

d. Possible changes in physical assessment
i. Changes in peripheral, core, and neurovascular perfusion
ii. Changes in response to pupils
iii. Changes in response to motor tests
iv. Dysrhythmias
v. Adventitious breath sounds

e. Assessment tools
i. Neurological examination of cranial nerves, motor and sensory function
ii. Blood pressures
iii. Evaluation of limb lead ECG
iv. Interpretation of 12 lead ECG for signs of ischemia, injury, or anomalies
v. Auscultation of heart to detect irregular, muffled, or extra heart tones
vi. Auscultation of breath sounds to detect adventitious noises
vii. Capnography
viii. Evaluation of glucose

f. Treatment
i. Airway, ventilatory, and circulatory support
ii. Oxygen with adjuncts appropriate to patient condition
iii. Venous access
iv. ECG monitoring
v. Treatment to correct reversible causes
1. Correct hypoglycemia with D50 IV or glucagon
2. Correct possible drug overdose (consider Narcan)
vi. Evaluation of patient treatment through reassessment

15. GI gastrointestinal bleeding (caused by disease processes, inflammation, infection, and obstruction of the upper and lower gastrointestinal tract)

a. Evaluation of pathophysiology through history, possible risk factors, and current medications
i. Peptic ulcer disease
ii. Esophageal varices
iii. Stomach cancer
iv. Esophageal cancer
v. Diverticulitis
vi. Bowel obstruction

vii. Smoking
viii. Alcohol/cirrhosis of the liver
ix. Medications in use (nonsteroidal anti-inflammatory drugs, warfarin)

b. Associated signs and symptoms
i. Hematemesis
ii. Bilious vomitus
iii. Melena
iv. Dyspepsia
v. Hepatomegaly
vi. Jaundice
vii. Constipation, diarrhea
viii. Agitation, inability to find a comfortable position
ix. Dizziness

c. Possible changes in physical assessment
i. Changes in peripheral, core, and neurovascular perfusion
ii. Pale or yellow, thin skin, frail musculoskeletal system
iii. Peripheral, sacral, and periorbital edema
iv. Hypertension
v. Fever
vi. Tachycardia
vii. Dyspnea

d. Assessment tools
i. Evaluation of limb lead ECG
ii. Interpretation of 12 lead ECG for signs of ischemia, injury, or anomalies
iii. Blood pressures (lying, sitting, and standing, noting any change of 10 mm/Hg or more lower as the patient moves to an upright position)
iv. Pulses, lying sitting, and standing, noting any change of 10 beats per minute more higher as the patient moves to an upright position
v. Auscultation of heart to detect irregular, muffled, or extra tones
vi. Auscultation of breath sounds to detect adventitious noises or foreign bodies
vii. Auscultation of bowel sounds; palpation of abdomen

e. Treatment
i. Management of upper GI bleeds is not dependent upon the identifying the underlying cause; however, assessment and history are the key to successful treatment of this emergency life threatening illness
ii. Airway, ventilatory, and circulatory support
iii. Oxygen with adjuncts appropriate to patient condition
iv. Venous access (Care should be taken to avoid use of indwelling fistulas or shunt unless necessary in cardiac events; depending on patient presentation, it may be necessary to

place two large bore IVs)
v. Dysrhythmia management according to current ACLS standards or local protocol.
vi. Evaluation of patient treatment through reassessment
vii. Definitive care of renal patients in dialysis
viii. Fever
ix. Tachycardia
x. Tachypnea
xi. Diffuse tenderness on palpation of abdomen, with distention, guarding, or masses; upon auscultation high pitched noises
xii. Hypovolemia

16. Biliary disease (disorders of the liver and gallbladder)
    a. Evaluation of pathophysiology through history, possible risk factors, and current medications
        i. Liver disease
        ii. Congestive heart failure
        iii. Gallstones
        iv. Cholecystitis
        v. Medications that cause adverse effects on the liver
    b. Associated signs and symptoms
        i. Jaundice
        ii. Fever
        iii. Right upper quadrant pain, radiating to upper back and shoulder
        iv. Vomiting
    c. Possible changes in physical assessment
        i. Changes in peripheral, core, and neurovascular perfusion
        ii. Pale or yellow, warm skin
        iii. Fever
        iv. Tachycardia
        v. Tachypnea due to pain in the abdomen
        vi. Diffuse tenderness in right upper quadrant on palpation of abdomen, guarding
    d. Assessment tools
        i. Evaluation of limb lead ECG
        ii. Interpretation of 12 lead ECG for signs of ischemia, injury, or anomalies
        iii. Blood pressures
        iv. Auscultation of heart to detect irregular, muffled, or extra tones
        v. Auscultation of breath sounds to detect adventitious noises
        vi. Auscultation of bowel sounds; palpation of abdomen
    e. Treatment
        i. Airway, ventilatory, and circulatory support
        ii. Oxygen with adjuncts appropriate to patient condition
        iii. Venous access
        iv. Dysrhythmia management according to current ACLS standards or area protocol

v. Evaluation of patient treatment through reassessment

17. Chronic renal failure (the inability of the kidneys to excrete waste, concentrate urine, or control electrolyte balance in the body)
    a. Evaluation of pathophysiology through history, possible risk factors, and current medications
        i. Diabetes
        ii. Congenital disorders
        iii. Pyelonephritis
        iv. Hypertension
        v. Autoimmune disorders
        vi. Glomerulonephritis
        vii. Medications that damage the kidneys (antibiotics, nonsteroidal anti-inflammatory drugs, anticancer drugs)
    b. Associated signs and symptoms
        i. Hypertension
        ii. Headache
        iii. Anxiety
        iv. Fatigue
        v. Anorexia
        vi. Vomiting
        vii. Increased voiding of brown colored urine
        viii. Confusion
        ix. Seizures
        x. Musculoskeletal pain
    c. Possible changes in physical assessment
        i. Changes in peripheral, core, and neurovascular perfusion
        ii. Pale or yellow, thin skin; frail musculoskeletal system
        iii. Peripheral, sacra, and periorbital edema
        iv. Hypertension
        v. Fever
        vi. Tachycardia
        vii. Dyspnea
    d. Assessment tools
        i. Evaluation of limb lead ECG
        ii. Interpretation of 12 lead ECG for signs of ischemia, injury, or anomalies
        iii. Blood pressures
        iv. Auscultation of heart to detect irregular, muffled, or extra tones
        v. Auscultation of breath sounds to detect adventitious noises
        vi. Auscultation of bowel sounds; palpation of abdomen
    e. Treatment
        i. Airway, ventilatory, and circulatory support
        ii. Oxygen with adjuncts appropriate to patient condition
        iii. Venous access (care should be taken to avoid use of indwelling fistulas or shunt unless necessary in cardiac events)

iv. Dysrhythmia management according to current ACLS standards or area protocol
v. Evaluation of patient treatment through reassessment
vi. Definitive care of renal patients is dialysis

18. Urinary tract infection
    a. Evaluation of pathophysiology through history, possible risk factors, and current medications
        i. Diabetes
        ii. Prostatitis
        iii. Cystocele
        iv. Ureterocele
        v. Kidney obstruction
        vi. Indwelling foley catheters
        vii. Medications used (immunosuppressive and chemotherapy)
    b. Associated signs and symptoms
        i. Urinary frequency and urgency
        ii. Dysuria
        iii. Hematuria
        iv. Nausea, vomiting, and diarrhea
        v. Anorexia
        vi. Shortness of breath
        vii. Fever
        viii. Hypothermia
    c. Possible changes in physical assessment
        i. Changes in peripheral, core, and neurovascular perfusion
        ii. Diaphoresis, pale, cool skin
        iii. Hypotension
        iv. Fever
        v. Tachycardia
    d. Assessment tools
        i. Evaluation of limb lead ECG
        ii. Interpretation of 12 lead ECG for signs of ischemia, injury, or anomalies
        iii. Blood pressures
        iv. Auscultation of heart to detect irregular, muffled, or extra tones
        v. Auscultation of breath sounds to detect adventitious noises
        vi. Auscultation of bowel sounds; palpation of abdomen
    e. Treatment
        i. Airway, ventilatory, and circulatory support
        ii. Oxygen with adjuncts appropriate to patient condition
        iii. Venous access
        iv. Supportive care
        v. Evaluation of patient treatment through reassessment of disease
19. Endocrine
    a. Diabetes mellitus (an inability of the pancreas to produce a sufficient amount of insulin, causing hyperglycemia)

i. Classification
   1. Type I diabetes is insulin dependent ("IDDM")
   2. Type II diabetes is on-insulin dependent ("NIDDM")
ii. Evaluation of pathophysiology through history, possible risk factors, and current medications
   1. Insulin deficiency
   2. Hyperglycemia (plasma levels greater than 200 mg/dl, fasting levels of greater than 126 mg/dl)
   3. Ketoacidosis
   4. Medications used (short-acting and long-acting insulin)
iii. Associated signs and symptoms
   1. Polyuria
   2. Polydipsia
   3. Polyphagia
   4. Anorexia
   5. Nausea, vomiting
   6. Neuropathy and paresthesia
iv. Possible changes in physical assessment
   1. Changes in peripheral core, and neurovascular perfusion
   2. Diaphoresis, pale skin, poor skin turgor; pale, dry, oral mucosa, furrowed tongue
   3. Hypotension
   4. Hypoglycemia/hyperglycemia
   5. Tachycardia
   6. Fever
v. Assessment tools
   1. Evaluation of limb lead ECG
   2. Interpretation of 12 lead ECG for signs of ischemia, injury or anomalies
   3. Blood pressures
   4. Blood glucose levels
   5. Distal pulses
   6. Auscultation of heart to detect irregular, muffled, or extra tones
   7. Auscultation of breath sounds to detect adventitious noises
   8. Temperature
   9. Capnography
vi. Treatment
   1. Airway, ventilatory, and circulatory support
   2. Oxygen with adjuncts appropriate to patient condition
   3. Venous access
   4. Correction of hypoglycemia with D50 IV
   5. Treatment of hyperglycemia with fluids
   6. Evaluation of patient treatment through reassessment

b. Diabetic ketoacidosis (diabetic complication of

IDDM that occurs when the patient becomes hyperglycemic; this causes the cells to burn fat, which causes the body to create ketones and ketoacids)

i. Evaluation of pathophysiology through history, possible risk factors, and current medications
   1. Non-compliance in medication use
   2. Recent myocardial infarction, stroke, infection, or anorexia
   3. Insulin pump use
   4. Medications used (short-acting insulin, long-acting insulin, metformin)

ii. Associated signs and symptoms
   1. Altered level of consciousness
   2. Visual disturbances
   3. Fruity or foul odor to breath (acetone halitosis)
   4. Weight loss
   5. Polyuria
   6. Polydipsia
   7. Polyphagia
   8. Abdominal pain
   9. Nausea and vomiting

iii. Possible changes in physical assessment
   1. Changes in peripheral, core, and neurovascular perfusion
   2. Warm, flushed skin (even though the patient can be hypothermic), poor skin turgor; pale, dry, oral mucosa, furrowed tongue
   3. Kussmaul respirations
   4. Hyperglycemia
   5. Tachycardia

iv. Assessment tools
   1. Evaluation of limb lead ECG
   2. Interpretation of 12 lead ECG for signs of ischemia, injury, or anomalies
   3. Blood pressures
   4. Blood glucose levels
   5. Distal pulses
   6. Auscultation of heart to detect irregular, muffled, or extra tones
   7. Auscultation of breath sounds to detect adventitious noises
   8. Temperature
   9. Capnography

v. Treatment
   1. Airway, ventilatory, and circulatory support
   2. Oxygen with adjuncts appropriate to patient condition
   3. Venous access
   4. Treatment of hyperglycemia with fluids
   5. Evaluation of patient treatment through

reassessment

c. Nonketotic hyperglycemic-hyperosmolar coma (diabetic complication of NIDDM in the elderly; unlike DKA, the resulting high blood glucose levels do not cause ketosis, but rather lead to osmotic diuresis and a shift of fluid to the intravascular space, resulting in dehydration)
   i. Evaluation of pathophysiology through history, possible risk factors, and current medications
      1. Type II diabetes (NIDDM)
      2. Non-compliance of medications
      3. Hypothermia
      4. Heat stroke
      5. Infections
      6. Cardiac disease
      7. Pancreatitis
      8. Stroke
      9. Medications
   ii. Associated signs and symptoms
      1. Hyperglycemia
      2. Polydipsia
      3. Dizziness
      4. Confusion
      5. Altered mental status
      6. Seizures
   iii. Possible changes in physical assessment
      1. Changes in peripheral, core, and neurovascular perfusion
      2. Warm, flushed skin, poor skin turgor; pale, dry, oral mucosa, furrowed tongue
      3. Hypotension and shock
      4. Tachycardia
      5. Blood glucose levels greater than 500 mg/dl
   iv. Assessment tools
      1. Evaluation of limb lead ECG
      2. Interpretation of 12 lead ECG for signs of ischemia, injury, or anomalies
      3. Blood pressures
      4. Blood glucose levels
      5. Distal pulses
      6. Auscultation of heart to detect irregular, muffled, or extra tones
      7. Auscultation of breath sounds to detect adventitious noises
      8. Temperature
      9. Capnography
   v. Treatment
      1. Airway, ventilatory, and circulatory support
      2. Oxygen with adjuncts appropriate to patient condition
      3. Venous access may necessitate two large bore IVs

4. Treatment of hyperglycemia with judicious use of fluid boluses
5. Evaluation of patient treatment through reassessment

d. Hypothyroidism (destruction of the thyroid tissue over time that causes an insufficient amount of thyroid hormone in the blood; myxedema coma is a premorbid consequence of hypothyroidism in the elderly caused by a recent history of surgery, hypothermia, infection, hypoglycemia, and sedative use)
   i. Evaluation of pathophysiology through history, possible risk factors, and current medications
      1. Anemia
      2. Congestive heart failure
      3. Hyponatremia
      4. Medications used (levothyroxines)
   ii. Associated signs and symptoms
      1. Cold intolerance
      2. Fatigue
      3. Weight gain
      4. Poor cognitive function
      5. Scaly dry skin and hair loss
      6. Peripheral and facial edema
      7. Altered mentation
      8. Depression, paranoia
   iii. Possible changes in physical assessment
      1. Changes in peripheral, core, and neurovascular perfusion
      2. Bradycardia
      3. Respiratory failure or arrest
      4. Hypercarbia
      5. Changes in blood glucose levels
      6. Non-pitting or pitting edema
   iv. Assessment tools
      1. Evaluation of limb lead ECG
      2. Interpretation of 12 lead ECG for signs of ischemia, injury, or anomalies
      3. Blood pressures
      4. Blood glucose levels
      5. Auscultation of heart to detect irregular, muffled, or extra tones
      6. Capnography and pulse oximetry
   v. Treatment
      1. Airway, ventilatory, and circulatory support
      2. Oxygen with adjuncts appropriate to patient condition; may necessitate aggressive management
      3. Venous access
      4. Correction of hypoglycemic levels with D50
      5. Dysrhythmia management according to current ACLS standards or area protocol

6. Evaluation of patient treatment through reassessment

20. Inflammatory arthritis
21. Osteo
    a. Osteoporosis (bone disease that decreases bone density)
        i. Type I osteoporosis is seen in post-menopausal women due to the decline in estrogen and most commonly causes radial and hip fractures
        ii. Type II occurs in both men and women over fifth and causes hip and vertebral fractures that can eventually result in dorsal kyphosis
        iii. Evaluation of pathophysiology through history, possible risk factors, and current medications
            1. Genetics
            2. Smoking
            3. Exercise habits
            4. Diets poor in calcium and vitamin D
            5. Gastrointestinal disorders
            6. Hormones
            7. Body type and weight
            8. Steroids
            9. Anticonvulsants
            10. Alcohol
    b. Osteoarthritis (progressive disease from repetitive trauma to the joints causing destruction of the cartilage; commonly strikes the hands, knees, hips, and spine)
    c. Rheumatoid arthritis (autoimmune disorder that affects the joints of the body; causes inflammation of the joints, resulting in pain and instability of the joints)
22. Immunological system anatomical and physiological changes, plus pathophysiology
    a. Immunological changes in the elderly
        i. Aging of the thymus and reduction of T-cells
        ii. Reduced leukocyte activity
        iii. Increased production of autoantibodies
    b. The changes in the immunological system of the elderly make them more prone to infections and exacerbations of chronic processes; these infections, compounded by an inability due to aging of the hypothalamus, may not produce a fever in the face of an immunological insult such as a viral, bacterial, or occult infection
23. Pressure ulcers (the decay of body tissue due to pressure on a site; this results in a lack of blood supply and oxygen to the tissues)
    a. Evaluation of pathophysiology through history and possible risk factors
        i. Brain or spinal cord injury
        ii. Neuromuscular disorders
        iii. Acute illness that results in loss of mobility

iv. Nutritional problems
v. Fecal or urinary incontinence

b. Areas of concern
i. Lower legs
ii. Sacrum
iii. Greater trochanter
iv. Buttocks

c. Stages of ulcer
i. Nonblanching erythema
ii. Blisters
iii. Ulcer exposing fat and fascia
iv. Ulcer exposing muscle or bone

d. Management at the BLS level

24. Herpes zoster (highly contagious virus that is manifested by a painful rash that affects the ganglion of a nerve and appears along the affected nerve pathway)

13.5 – Patients with Special Challenges

Objective	Educational Standard
13.5.1 – Abuse and Neglect	
C 13.5.1.1 – Discuss the epidemiology, history, assessment considerations, management, legal aspects, risk profiles, and documentation requirements applicable to abuse and neglect patients.	1. Introduction a. Epidemiology b. Definition of abuse (physical, emotional, sexual) and neglect 2. History a. Social b. Financial c. Ethical d. Other 3. Assessment a. Elements in the history or scene concerning for abuse or neglect b. Assessing the caregiver's behavior c. Physical findings concerning for abuse or neglect d. Benign findings often confused for physical or sexual abuse 4. Management a. Role of the prehospital professional (scene assessment, assessment of the caregiver, communication with the caregiver, documentation, reporting suspected abuse/neglect, safely transporting one or more injured children) b. Role of Child/Adult Protective Services c. Role of Medical Examiner and law enforcement 5. Legal aspects a. Abuse b. Neglect c. Assault d. Sexual assault 6. Risk profile of abuse victim 7. Risk profile of the abuse/assailant 8. Documentation a. Empirical (non-judgmental) b. Subjective (patient/other description) i. Use quotes ii. Identify the resource iii. Avoid judgment of potential abuse/assailant c. Objective i. Observations ii. Descriptions iii. Time frame
13.5.2 – Homelessness/Poverty	
C 13.5.2.1 – Describe the challenges associated with, resources available for, and special considerations in the treatment of homeless or poverty-stricken patients.	1. Advocate for patient rights and appropriate care 2. Identify facilities that will treat regardless of payment 3. Prevention strategies will likely be absent,

	increasing the probability of disease 4. Familiarity with assistance resources offered in community 5. It is estimated that 41 million Americans and one-third of people living in poverty have no health insurance, and insurance coverage held by many others would not carry them through a catastrophic illness 6. Financial challenges for health care can quickly result from loss of a job and depletion of savings 7. Financial challenges combined with medical conditions that require uninterrupted treatment (e.g., TB, HIV/AIDS, diabetes, hypertension, mental disorders) or that occur in the presence of unexpected illness or injury can deprive the patient of basic health care services 8. In addition, poor health is closely associated with homelessness, where rates of chronic or acute health problems are extremely high 9. Special considerations a. People with financial challenges are often apprehensive about seeking medical care b. When caring for a patient with financial challenges who is concerned about the cost of receiving needed health care, explain the following: i. Patient's ability to pay should never be a factor in obtaining emergency health care ii. Federal law mandates that quality, emergency health care be provided, regardless of the patient's ability to pay iii. Payment programs for health care services are available in most hospitals iv. Government services are available to assist patients in paying for health care v. Free (or near-free) health care services are available through local, state, and federally-funded organizations c. In cases where no life-threatening condition exists, counsel the patient with financial challenges about alternative facilities for health care that do not require ambulance transport for emergency department evaluation d. Consider providing an approved list of alternative health care sites (e.g., a minor-emergency center or health clinic) that can provide medical care at less cost than those charged by emergency departments
13.5.3 – Bariatric Patients	
C 13.5.3.1 – Discuss the risk factors, special considerations, and patient-handling issues associated with bariatric patients.	1. Definition 2. Risk factors a. Caloric intake that exceeds calories burned b. Low basal metabolic rate

	c. Genetic predisposition for obesity 3. Associated with an increased risk for the following: a. Hypertension b. Stroke c. Heart disease d. Diabetes e. Some cancers f. Injury 4. Long-term health effects 5. Special considerations 6. Patient-handling issues a. To prevent back injuries b. To position the patient to breathe
13.5.4 – Technology Assisted/Dependent	
C 13.5.4.1 – Describe care considerations for the technology assisted/dependent patient.	1. Ventilation devices 2. Apnea monitoring/pulse oximetry 3. Long-term vascular access devices 4. Dialysis shunts 5. Nutritional support (i.e., gastric tubes) 6. Elimination diversion
13.5.5 – Hospice Care and Terminally Ill	
C 13.5.5.1 – Describe hospice care and terminally ill care considerations.	1. What is hospice? a. Comfort care versus curative care b. Terminally ill as verified by physician c. Typically cancer, heart failure, Alzheimer's disease, AIDS 2. EMS intervention 3. DNR (do not resuscitate) orders
13.5.6 – Tracheostomy Care/Dysfunction	
C 13.5.6.1 – Describe the care considerations for a patient with a tracheostomy.	1. Tracheostomy (surgical opening from the anterior neck into the trachea) 2. Consists of: a. Stoma b. Outer cannula c. Inner cannula 3. Routine care a. Keep stoma clean and dry b. Change outer cannula as needed c. Suction as needed 4. Acute care
13.5.7 – Technology Assisted Patients	
C 13.5.7.1 – Discuss the assessment and management of patients who require adaptive/assistive technology devices.	1. Profile of patients requiring adaptive devices 2. Adaptive devices a. Positive pressure ventilation devices i. CPAP/BiLevel ii. Ventilators iii. Other b. Negative pressure ventilation devices i. Ventilators ii. Phrenic nerve stimulators iii. Diaphragm pacers c. Apnea monitoring/pulse oximetry

	d. Airways (tracheostomy tubes) e. Long-term vascular access devices i. Midlines ii. PICC lines iii. Central lines iv. Implanted ports v. Other f. Medication administration systems g. Ventricular assist devices h. Cerebrospinal fluid ("CFS") shunts i. Hemodialysis j. Peritoneal dialysis k. Nutritional support i. Gastric ii. Jejunum l. Elimination i. Intestinal diversion ii. Urinary diversion m. Braces n. Mobility o. Wounds i. Closures ii. Drains p. Other 3. Assessment 4. Management approach
13.5.8 – Pediatric Developmental Disabilities	
C 13.5.8.1 – Describe the causes, signs, and special considerations in management of pediatric patients with developmental disabilities.	1. Impaired or insufficient development of the brain that causes an inability to learn at the usual rate (developmental delay) 2. Causes include the following: a. Unsatisfactory parental interaction b. Severe vision or hearing impairment c. Mental retardation d. Brain damage e. Severe diseases of body organs and systems f. Congenital anomalies 3. Signs of developmental delay may be evidenced by changes in: a. Walking upright b. Fine hand-eye coordination c. Listening, language, and speech d. Social interaction 4. Accommodations that may be necessary when providing patient care include allowing adequate time for obtaining a history, performing assessment and patient management procedures, and preparing the patient for transport 5. Down syndrome a. Features of the patient with Down syndrome b. Cellular etiology i. Results in a triplet of chromosomes 21 ii. Extra number 21 chromosome

	iii. Increased maternal age iv. Family history of Down syndrome c. Special considerations i. Life expectancy ii. Caregiver interactions iii. Common associated disorders iv. Cognitive ability of the Down's patient 6. Autism a. Features of a patient with autism b. Etiology c. Special considerations i. Caregiver interactions ii. Cognitive ability of the autistic patient
13.5.9 – Emotionally Impaired	
C 13.5.9.1 – Describe the causes and special considerations in management of emotionally impaired patients.	1. People with emotional impairments include those with the following: a. Neurasthenia (nervous exhaustion) b. Anxiety neurosis c. Compulsion neurosis d. Hysteria 2. Special considerations a. Signs and symptoms that may result from emotional impairment b. Complete history and examination c. Prehospital management d. Emotionally/mentally impaired ("EMI") i. IQ assessment as: 1. Mild (IQ 50 to 70) 2. Moderate (IQ 35 to 59) 3. Profound (IQ less than 20) ii. Causes of mental retardation 1. Genetic conditions a. Phenylketonuria b. Chromosomal disorder c. Fragile X syndrome 2. Problems during pregnancy a. Use of alcohol or other drugs by the mother b. Use of tobacco c. Illness and infection 3. Problems at birth a. Brain injury b. Prematurity c. Low birth weight 4. Problems after birth a. Childhood diseases b. Injury c. Exposure to lead, mercury, and other environmental toxins 5. Poverty and cultural deprivation a. Malnutrition b. Disease-producing conditions c. Inadequate medical care d. Environmental health hazards

	e. Lack of stimulation iii. Special considerations
13.5.10 – Physical Needs/Challenges	
C 13.5.10.1 – Discuss special considerations in managing patients with specific physical needs or challenges (hearing, visual, speech, or paraplegia/quadriplegia).	1. Hearing impairments a. Deafness i. Etiology ii. Types of deafness b. Sensorineural deafness c. Hearing impairments i. Prolonged exposure to loud noise ii. Disease (e.g., Meniere's disease) iii. Tumors iv. Medications v. Viral infections vi. Natural degeneration of the cochlea and/or labyrinth in old age vii. Auditory process deficits viii. Auditory dyssynchrony ix. Conductive hearing loss x. Mixed hearing loss xi. Sensorineural hearing loss d. Special considerations (use of hearing aids) 2. Visual impairments a. Normal vision b. Visual impairments i. Cataracts ii. Degeneration of the eyeball, optic nerve, or nerve pathways iii. Disease (e.g., diabetes, hypertension) iv. Eye or brain injury v. Infection (e.g., CMV, HSV, bacterial ulcers) vi. Vitamin A deficiency in children living in poor countries vii. Glaucoma viii. Myopia ix. Hyperopia x. Amblyopia xi. Optic nerve atrophy xii. Optic nerve hypoplasia xiii. Retinal diseases xiv. Retinopathy xv. Cortical visual impairment xvi. Strabismus c. Special considerations 3. Speech impairments a. Includes disorders of language, articulation, voice production, or fluency (blockage of speech); all of which can lead to an inability to communicate effectively b. Speech i. Language disorders ii. Language learning disabilities iii. Language processing disorders iv. Semantic-pragmatic disorders

	v. Articulation disorders vi. Phonological process disorders vii. Motor speech diso 4. Paraplegia/quadriplegia a. Define paraplegia b. Define quadriplegia c. Causes i. Motor vehicle crash ii. Sports injury iii. Fall iv. Gunshot wound v. Medical illness d. Both paraplegia and quadriplegia are accompanied by a loss of sensation and may have loss of urinary and/or bowel control e. Special considerations i. Patients with extremity and trunk paralysis may require accommodations in patient care ii. Assessment 1. Patient may have an external device to stabilize the spine 2. Ostomies a. Trachea b. Bladder c. Colon 3. Priapism may be present in some male patients iii. Transport iv. Additional manpower may be needed to move special equipment and prepare patient for transport v. Pressure that would be appreciated by patients with normal sensation may not be recognized in patients with these impairments
13.5.11 – Patients with Communicable Diseases	
C 13.5.11.1 – Discuss special considerations in providing care to patients with communicable diseases.	1. Overview a. Exposure to some infectious diseases can pose a significant health risk to EMS providers b. It is important to ensure personal protection on every emergency response c. Required precautions will depend on the mode of transmission and the pathogen's ability to create pathological processes i. In some cases, gloves will provide for necessary protection ii. In other cases, respiratory barriers will also be indicated 2. Special considerations a. Some infectious diseases (e.g., AIDS) will take a toll on the emotional well-being of affected

	patients, their families, and loved ones b. Psychological aspects of providing care to these patients include an emphasis on the following: i. Recognizing each patient as an individual with unique health care needs ii. Respecting each person's personal dignity iii. Providing considerate, respectful care focused upon the person's individual needs
13.5.12 – Terminally Ill Patients	
C 13.5.12.1 – Discuss special considerations in providing care to terminally ill patients.	1. Overview a. Paramedics will care for terminally ill patients (patients with advanced stages of disease with an unfavorable prognosis and no known cure) b. These will often be emotionally-charged encounters that will require a great deal of empathy and compassion for the patient and his or her loved ones c. If EMS has been summoned to assess late stages of a patient's terminal illness or a change in the patient's condition, gather a complete history and ask the patient or family about advance directives and the appropriateness of resuscitation procedures d. Hospice are (the goal of hospice care is comfort during the end of a terminal illness) 2. Special considerations a. Care of a terminally ill patient will often be primarily supportive and limited to calming and comfort measures, and perhaps transport for physician evaluation b. Pain assessment and management are important in caring for these patients i. Attempt to gather a complete pain medication history ii. Examine the patient for the presence of transdermal drug patches or other pain-relief devices c. Following an assessment of the patient's vital signs, level of consciousness, and medication history, medical direction may recommend the administration of analgesics or sedatives to ensure the patient's comfort
13.5.13 – Mental Needs/Challenges	
C 13.5.13.1 – Discuss special considerations in providing care to patients with psychiatric disorders.	1. Mental illness refers to any form of psychiatric disorder 2. Psychoses a. Comprises a group of mental disorders in which the individual loses contact with reality b. Thought to be related to complex biochemical disease that disorders brain function c. Examples

	i. Schizophrenia ii. Bipolar disorder (manic-depressive illness) iii. Organic brain disease 3. Neuroses a. Refers to diseases related to upbringing and personality in which the person remains "in touch" with reality b. Neurotic symptoms generally do not limit work or social activity and tend to fluctuate in intensity with stress c. Examples i. Depression ii. Phobias iii. Obsessive-compulsive behavior 4. Special considerations a. Recognizing a patient who is mentally challenged may be difficult, especially when caring for mildly neurotic patients whose behavior may be unaffected b. Patients with more serious disorders may present with signs and symptoms consistent with mental illness c. When obtaining the patient history, do not be hesitant to ask about: i. History of mental illness ii. Prescribed medications iii. Compliance with prescribed medications iv. Concomitant use of alcohol or other drugs 5. If the patient appears to be paranoid or shows anxious behavior, ask the patient's permission before beginning any assessment or performing any procedure 6. Once rapport and trust have been established, care should proceed in the same manner as for a patient who does not have mental illness (unless the call is related specifically to the mental illness) 7. These patients experience illness and injury like all other patients
13.5.14 – Specific Challenges Created by Chronic Conditions	
C 13.5.14.1 – Discuss the specific challenges and considerations associated with chronic conditions.	1. Arthritis a. Inflammation of a joint, characterized by pain, stiffness, swelling, and redness b. Has many forms and varies widely in it's effects c. Two common forms: i. Osteoarthritis results from cartilage loss and wear and tear of the joints (common in elderly patients) ii. Rheumatoid arthritis is an autoimmune disorder that damages joints and surrounding tissues d. Special considerations

e. Assessment
    i. Decreased range of motion/mobility may limit physical examination
    ii. Be sure to solicit current medications before considering the administration of medications
f. Management and transportation strategies
g. Consider the patient's limited mobility
h. Equipment (e.g., backboards, splints) must be adjusted to "fit the patient" (not vice versa) by supplying adequate padding to fill all voids

2. Cancer
    a. A group of diseases that allow for an unrestrained growth of cells in one or more of the body organs or tissues
    b. Malignant tumors most commonly develop in major organs/glands (e.g., the lungs, breasts, intestine, skin, stomach, and pancreas) but may also occur in cell-forming tissues of the bone marrow and in the lymphatic system, muscle, or bone
    c. Special considerations
    d. Signs and symptoms depend on the cancer's primary site of origin
    e. Many cancer patients take anticancer drugs and pain medications through surgically implanted ports (e.g., mediports)
    f. Transdermal skin patches that contain analgesic agents are common
3. Cerebral palsy ("CP")
    a. General term for nonprogressive disorders of movement and posture
    b. Results from damage to the fetal brain during later months of pregnancy, during birth, during the newborn period, or in early childhood
    c. Causes
        i. Most common cause is cerebral digenesis (abnormal cerebral development) or cerebral malformation
        ii. Less common causes include the following:
            1. Fetal hypoxia
            2. Birth trauma
            3. Maternal infection
            4. Kernicterus (excessive fetal bilirubin, associated with hemolytic disease)
    d. Produces abnormal stiffness and contraction of groups of muscles
    e. Child may be categorized as having one of the following conditions:
        i. Diplegia (affecting all four limbs; the legs more severely than the arms)
        ii. Hemiplegia (affecting limbs only on one side of the body; the arm usually more

severe than the leg)
iii. Quadriplegia (affecting all four limbs severely; not necessarily symmetrically)
iv. Athetosis (producing involuntary writhing movements)
v. Ataxia (producing a loss of coordination and balance)
vi. Hearing defects, epilepsy, and other CNS disorders are commonly present with the disease
vii. Special considerations
1. Weakness
2. Paralysis
3. Developmental delay
f. Some children with mild CP attend regular schools
g. Those with more severe forms of the disease never learn to walk or effectively communicate and require lifelong skilled nursing care

4. Cystic fibrosis ("CF") (mucoviscidosis)
a. Inherited metabolic disease of the lungs and digestive system that manifests itself in childhood
b. Caused by a defective recessive gene inherited from each parent
c. Predisposes the individual to chronic lung infections
i. In addition, the pancreas of a patient with CF fails to produce the enzymes required for the breakdown of fats and their absorption from the intestine
ii. These alterations in metabolism cause classic symptoms of CF that include the following:
1. Pale, greasy-looking, and foul-smelling stools (often noticeable soon after birth)
2. Persistent cough and breathlessness
3. Lung infections that often develop into pneumonia, bronchiectasis, and bronchitis
iii. Other features of the disease include stunted growth and sweat glands that produce abnormally salty sweat
iv. In some cases, the child with CF may fail to thrive
v. Special considerations
1. Older patients (and parents of children) with CF are generally aware of their disease
2. Some may be oxygen-dependent and will require respiratory support and suctioning to clear the airway of mucus and secretions

3. Expect a lengthy history and physical exam due to the nature of the disease and associated medical problems
4. Some patients will have received heart and lung transplants, and may require transfer to specialized medical facilities for treatment
5. If parents are unaware of the possibility of CF in the presence of signs and symptoms described above, the paramedic should advise the physician at the receiving hospital of his or her suspicions

5. Multiple sclerosis ("MS")
   a. Progressive and incurable autoimmune disease of the CNS, in which scattered patches of myelin in the brain and spinal cord are destroyed
   b. Cause of MS is unknown; however, it may have a heritable or viral component
   c. Disease usually begins early in adult life; MS may develop and progress continually or it may become active for a brief time and them resume years later
   d. Symptoms vary with the affected areas of the CNS and may include:
      i. Brain involvement
      ii. Fatigue
      iii. Vertigo
      iv. Clumsiness
      v. Muscle weakness
      vi. Slurred speech
      vii. Ataxia
      viii. Blurred or double vision
      ix. Numbness, weakness, or pain in the face
      x. Tingling, numbness, or feeling of constriction in any part of the body
      xi. Extremities that feel heavy and become weak
      xii. Spasticity
      xiii. Incontinence
   e. Symptoms of MS may occur singly or in combination, and may last from several weeks to several months
   f. Some patients become disabled, bedridden, and incontinent early in middle life
   g. Disabled patients also often suffer from painful muscle spasms, constipation, urinary tract infection, skin ulcerations, and mood swings
   h. Disease is managed with medications, physical therapy, and counseling
   i. Special considerations
      i. Some patients with MS may be difficult to examine and may be unable to provide a

complete medical history due to the nature of their illness
ii. Allow extra time for patient assessment and to prepare the patient for transport
iii. Respiratory support may be indicated in severe cases

6. Muscular dystrophy
   a. Inherited muscle disorder that results in a slow but progressive degeneration of muscle fibers
   b. Classified according to the following:
      i. Age that symptoms first appear
      ii. Rate at which the disease progresses
      iii. Way in which it is inherited
   c. Muscular dystrophy is incurable
   d. Most common form of the disease is Duchenne muscular dystrophy
      i. Caused by a sex-linked, recessive gene that affects only males
      ii. Rarely diagnosed before three years of age
      iii. Signs and symptoms include:
         1. Child slow in learning to sit up and walk
         2. Unusual gait
         3. Curvature of the spine
         4. Muscles that become bulky as they are replaced by fat
         5. Eventually, most children will be unable to walk
      iv. Many do not live beyond their teenage years because of chronic lung infections and congestive heart failure
   e. Special considerations
      i. Young children will be relatively easy to examine and prepare for transport
      ii. Older patients may require additional manpower and resources to assist with moving the patient to the ambulance
      iii. Respiratory support may be indicated in severe cases
7. Poliomyelitis (polio)
   a. Infectious disease caused by poliovirus hominis
   b. Virus is spread through direct and indirect contact with infected feces and by airborne transmission
   c. Incidence has declined since the Salk and Sabin vaccines were made available in the 1950s
   d. Signs and symptoms of polio in both the nonparalytic and paralytic forms include the following:
      i. Fever
      ii. Malaise

iii. Headache
iv. Intestinal upset
e. Often, people with the nonparalytic form of polio recover completely
f. In the paralytic form, extensive paralysis of muscles of the legs and lower trunk can occur
g. Special considerations
i. Caring for a patient with paralytic polio who has respiratory paralysis may require advanced airway support to ensure adequate ventilation
ii. If the lower body is paralyzed, urinary catheterization may be indicated
iii. Additional resources and manpower may be needed to prepare the patient for transport

8. Previous head injury patients
a. Traumatic brain injury can result from many mechanisms of trauma
b. These injuries can affect many cognitive, physical, and psychological skills
i. Cognitive deficits of language and communication, information processing, memory, and perceptual skills are common
ii. Physical deficit can include ambulation, balance and coordination, fine motor skills, strength, and endurance
iii. Psychological status is often altered
c. Special considerations
i. Depending on the patient's area of brain injury, obtaining a history and performing assessment and patient care procedures may be very difficult
ii. Some patients may require restraint
iii. Family members and other caregivers should be:
1. Involved in managing the patient (when appropriate)
2. Interviewed to determine if the patient's actions and response are "normal" for the patient
iv. Expect to spend additional time at the scene to provide care to these patients

9. Spina bifida
a. Congenital defect in which part of one or more vertebrae fails to develop, leaving part of the spinal cord exposed
b. Condition ranges in severity from minimal evidence of a defect to severe disability
c. In severe cases, the legs of some children may be deformed with partial or complete paralysis and loss of sensation in all areas below the level of the defect
d. Associated abnormalities may include:

i. Hydrocephalus with brain damage
ii. Cerebral palsy
iii. Epilepsy
iv. Mental retardation

e. Special considerations
i. Because of the varying degrees of spina bifida, prehospital care will need to be tailored to the patient's specific needs
ii. Some patients will require no special accommodations
iii. Others will need extended on-scene time for assessment and management, and perhaps additional resources and manpower to prepare the patient for transport

10. Myasthenia gravis
a. Autoimmune disorder in which muscles become weak and tire easily
b. Damage occurs to muscle receptors that are responsible for transmitting nerve impulses, commonly affecting muscles of the eyes, face, throat, and extremities
c. Rare disease that can begin suddenly or gradually
d. Can occur at any age, but usually appears in women between age 20 and 30, and in men between 70 and 80 years of age
e. Classic signs and symptoms include:
i. Drooping eyelids, double vision
ii. Difficulty in speaking
iii. Difficulty in chewing and swallowing
iv. Difficult extremity movement
v. Weakened respiratory muscles
f. Affected muscles become worse with use, but may recover completely with rest
g. May be exacerbated by infection, stress, medications, and menstruation
h. Can often be controlled with drug therapy to enhance the transmission of nerve impulses in the muscles
i. Special considerations
i. Accommodations required for care vary based on the patient's presentation
ii. In most cases, supportive care and transport will be all that is required
iii. In the presence of respiratory distress, measures should be taken to ensure adequate airway and ventilatory support

14.0 – EMS Operations

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

14.1 – Principles of Safely Operating a Ground Ambulance

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

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

See EMR and EMT levels.

14.2 – Incident Management

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

Objective	Educational Standard
14.2.1 – National Incident Management System ("NIMS")	
C 14.2.1.1 – Complete FEMA IS-700 and IS-100 training.	Online IS-100: http://emilms.fema.gov/IS100b/index.htm IS-700: http://emilms.fema.gov/IS700aNEW/index.htm
P 14.2.1.2 – Apply National Incident Management System ("NIMS") standards.	N/A

14.3 – Multiple Casualty Incidents

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

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

See EMR and EMT levels.

Objective	Educational Standard
14.3.1 – Triage Systems	
P 14.3.1.1 – Utilize a triage system for mitigating multiple casualty incidents.	1. START 2. JUMPSTART 3. SALT

14.4 – Air Medical

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

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

Objective	Educational Standard
14.4.1 – Medical Risks/Needs/Advantages	
C 14.4.1.1 – Describe the medical risks, needs, and advantages to utilizing air medical services.	1. Risks a. Aircraft crash b. Usually more severe restrictions on the number of caregivers for the patient 2. Needs a. Patient's condition would benefit by decreasing transport interval b. Patient requires time-sensitive assessment or intervention not available at local facility c. Patient is located in area not accessible by ground EMS team or ambulance 3. Advantages a. Decreased transport interval if transport distance is extreme b. Availability of highly trained medical crews c. Availability of specialized medical equipment

14.5 – Vehicle Extrication

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

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

Objective	Educational Standard
14.5.1 – Safe Vehicle Extrication	
C 14.5.1.1 – Discuss safety considerations integral to vehicle extrication operations.	1. Role of EMS in vehicle extrication a. Provide patient care b. Perform simple extrication 2. Personal safety a. First priority for all EMS personnel b. Appropriate personal protective equipment for conditions c. Scene size-up 3. Patient safety a. Keep them informed of your actions b. Protect from further harm 4. Situational safety a. Control traffic flow i. Proper positioning of emergency vehicles 1. Upwind/uphill 2. Protect scene ii. Use of lights and other warning devices iii. Setting up protective barrier iv. Designate a traffic control person b. 360° assessment i. Downed electrical lines ii. Leaking fuels or fluids iii. Smoke or fire iv. Broken glass v. Trapped or ejected patients vi. Mechanism of injury c. Vehicle stabilization i. Place vehicle in “park” or in gear ii. Set parking brake iii. Turn off vehicle ignition iv. Cribbing/chocking v. Move seats back and roll down windows vi. Disconnect battery or power source vii. Identify and avoid hazardous vehicle safety components d. Unique hazards i. Alternative-fuel vehicles ii. Undeployed vehicle safety devices

	iii. Hazardous materials e. Evaluate the need for additional resources i. Extrication equipment ii. Fire suppression iii. Law enforcement iv. Hazardous materials v. Utility companies vi. Air medical vii. Others f. Extrication considerations i. Disentanglement of vehicle from patient ii. Multi-step process iii. Rescuer-intensive iv. Equipment-intensive v. Time-intensive vi. Access to patient 1. Simple a. Try to open doors b. Ask patient to unlock doors c. Ask patient to lower windows 2. Complex 3. Tools a. Hand b. Pneumatic c. Hydraulic d. Other 5. Determine number of patients (implement local multiple casualty incident protocols if necessary)
14.5.2 – Use of Simple Hand Tools	
C 14.5.2.1 – Identify simple hand tools that can be used for vehicle extrication.	1. Hammer 2. Center punch 3. Pry bar 4. Hack saw 5. Come-along
14.5.3 – Special Considerations for Patient Care	
C 14.5.3.1 – Discuss special considerations for care of a patient requiring extrication from a vehicle.	1. Removing patient a. Maintain manual cervical pine stabilization b. Complete primary assessment c. Provide critical interventions 2. Assist with rapid extrication 3. Move patient, not device 4. Use sufficient personnel 5. Use path of least resistance

14.6 – Hazardous Materials Awareness

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

Objective	Educational Standard
14.6.1 – Hazardous Materials Awareness	
C 14.6.1.1 – Complete hazardous materials awareness/cold zone operations (HAZWOPER) training.	OSHA 29 CFR 1910.120 requirements
C 14.6.1.2 – Comply with Wisconsin weapons of mass destruction ("WMD") training requirements.	N/A
P 14.6.1.3 – Prepare for the treatment of patients exposed to hazardous materials.	N/A

14.7 – Mass Casualty Incidents Due to Terrorism and Disaster

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

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

Objective	Educational Standard
14.7.1 – Risks and Responsibilities of Operating on the Scene of a Natural or Man-Made Disaster	
C 14.7.1.1 – Discuss the role of EMS and safety considerations while operating on the scene of a natural or man-made disaster.	1. Role of EMS a. Personal safety b. Provide patient care c. Initiate/operate in an incident command system ("ICS") d. Assist with operations 2. Safety a. Personal i. First priority for all EMS personnel ii. Appropriate personnel protective equipment for conditions iii. Scene size-up iv. Time, distance, and shielding for self-protection v. Emergency responders are targets vi. Dangers of the secondary attack b. Patient i. Keep them informed of your actions ii. Protect from further harm iii. Signs and symptoms of biological, nuclear, incendiary, chemical, and explosive ("B-NICE") substances iv. Concept of "greater good" as it relates to any delay v. Treating terrorists/criminals c. 360° assessment and scene size-up i. Outward signs and characteristics of terrorist incidents ii. Outward signs of a weapons of mass destruction ("WMD") incident iii. Outward signs and protective actions of biological, nuclear, incendiary, chemical, and explosive ("B-NICE") weapons d. Determine number of patients (implement local multiple-casualty incident ["MCI"] protocols as necessary) e. Evaluate need for additional resources

	f. EMS operations during terrorist, weapons of mass destruction, disaster events: i. All hazards safety approach ii. Initially distance from scene and approach when safe iii. Ongoing scene assessment for potential secondary events iv. Communicate with law enforcement at the scene of an armed attack v. Initiate or expand incident command system as needed vi. Perimeter use to protect rescuers and public from injury vii. Escape plan and a mobilization point at a terrorist incident g. Care of emergency responders on scene i. Safe use of an auto-injector for self and peers ii. Safe disposal of auto-injector devices after activation

Summary of Curriculum Objectives

0.0 – INTRODUCTION
- 0.1 – WISCONSIN PARAMEDIC PROGRAM OUTCOMES
- 0.2 – CURRICULUM BACKGROUND AND EMS TRAINING CENTER ADAPTATION
- 0.3 – PROGRAM PREREQUISITES / PRESUMPTION OF PREREQUISITE EDUCATION
- 0.4 – WISCONSIN 2011 PARAMEDIC CURRICULUM COMMITTEE MEMBERS
- 0.5 – COURSE STRUCTURE AND TOPICAL HOUR GUIDELINES
- 0.6 – CLINICAL AND FIELD EXPERIENCES, MINIMUM HOURS AND COMPETENCY REQUIREMENTS

1.0 – PREPARATORY
- 1.1 – EMS SYSTEMS
  - *1.1.1 – History of EMS*
    - C 1.1.1.1 – Describe key historical events that influenced the national development of Emergency Medical Services (EMS) systems.
  - *1.1.2 – EMS Systems*
    - C 1.1.2.1 – Identify the components of an EMS system.
    - C 1.1.2.2 – Describe the EMS chain of survival.
    - C 1.1.2.3 – Define various types of EMS services.
    - C 1.1.2.4 – Discuss the relationship between EMS and the state trauma system.
    - C 1.1.2.5 – Discuss the role of the EMS physician.
  - *1.1.3 – Roles / Responsibilities / Professionalism of EMS Personnel*
    - C 1.1.3.1 – Describe the roles and responsibilities (attributes) of a paramedic as a health care professional.
    - C 1.1.3.2 – Describe the leadership/affective characteristics of a paramedic.
    - C 1.1.3.3 – Describe the administrative duties performed by a paramedic.
    - C 1.1.3.4 – Describe the mechanisms by which paramedics are credentialed as health care professionals.
    - C 1.1.3.5 – List less traditional roles filled by paramedics.
    - C 1.1.3.6 – List the operational responsibilities of paramedics.
    - C 1.1.3.7 – Describe the role of education in defining paramedics as healthcare professionals.
    - C 1.1.3.8 – Define professionalism as it applies to the paramedic.
    - C 1.1.3.9 – List affective characteristics of paramedics.
    - A 1.1.3.10 – Plan for emergencies and the delivery of paramedic services.
    - P 1.1.3.11 – Maintain EMS vehicles and equipment.
    - A 1.1.3.12 – Apply integrity to the position.
    - A 1.1.3.13 – Demonstrate empathy with patients.
    - A 1.1.3.14 – Assume responsibility for motivation of self and others.
    - A 1.1.3.15 – Maintain professional appearance and personal hygiene.
    - A 1.1.3.16 – Demonstrate self-confidence.
    - A 1.1.3.17 – Manage time effectively.
    - A 1.1.3.18 – Demonstrate career development skills.
    - A 1.1.3.19 – Demonstrate leadership.
    - A 1.1.3.20 – Work effectively in a team (with diplomacy).
    - A 1.1.3.21 – Exhibit respect in diverse settings.
    - A 1.1.3.22 – Serve as a patient advocate.
    - A 1.1.3.23 – Deliver careful service.
  - *1.1.4 – Quality Improvement*
    - C 1.1.4.1 – Define quality improvement in the EMS environment.
    - C 1.1.4.2 – Describe the contribution of continuous quality improvement (CQI) to EMS.
  - *1.1.5 – Patient Safety*
    - C 1.1.5.1 – Recognize significance of patient safety to EMS.
    - C 1.1.5.2 – Discuss incidence of medical errors.
    - C 1.1.5.3 – List high-risk EMS activities affecting patient safety.
    - C 1.1.5.4 – Describe how medical errors happen.
    - C 1.1.5.5 – Describe ways to prevent medical errors.
- 1.2 – RESEARCH
  - *1.2.1 – Research Principles to Interpret Literature and Advocate Evidence-Based Practice*

C 1.2.1.1 – Discuss medical research (introductory).
C 1.2.1.2 – Recognize importance of research in EMS.
C 1.2.1.3 – Define types of research.
C 1.2.1.4 – Describe ethical considerations in research.
C 1.2.1.5 – Discuss literature review.
C 1.2.1.6 – Define statistical concepts related to research.
C 1.2.1.7 – Relate research concepts to EMS.
C 1.2.1.8 – Discuss evidence-based decision making.

1.3 – WORKFORCE SAFETY AND WELLNESS

1.3.1 – Provider Safety and Well-Being

C 1.3.1.1 – Discuss the concepts of safety and wellness as they apply to the paramedic.

1.3.2 – Standard Safety Precautions

C 1.3.2.1 – Identify standard EMS safety precautions.

1.3.3 – Personal Protective Equipment

C 1.3.3.1 – Describe the equipment available in a variety of adverse situations for self-protection, including body substance isolation steps for protection from airborne and bloodborne pathogens.

1.3.4 – Stress Management

C 1.3.4.1 – Describe the three phases of the stress response, factors that trigger the stress response, and causes of stress in EMS.
C 1.3.4.2 – Describe the defense mechanisms and management techniques commonly used to deal with stress.
C 1.3.4.3 – Describe the stages of the grieving process and the unique challenges for paramedics in dealing with themselves, adults, children, and other special populations related to their understanding of death and dying.

1.3.5 – Prevention of Work-Related Injuries

C 1.3.5.1 – Identify ways to prevent EMS work-related injuries.

1.3.6 – Lifting and Moving Patients

C 1.3.6.1 – Differentiate proper from improper body mechanics for lifting and moving patients in emergency and nonemergency situations.

1.3.7 – Equipment

C 1.3.7.1 – Describe types and use of patient movement equipment.

1.3.8 – Disease Transmission

C 1.3.8.1 – Identify means of disease transmission and precautions to prevent such transmission.

1.3.9 – Wellness Principles

C 1.3.9.1 – Discuss wellness principles employed to enhance the physical and mental wellbeing of the paramedic.

1.4 – DOCUMENTATION

1.4.1 – Principles of Medical Documentation and Report Writing

C 1.4.1.1 – Identify minimum data to be included on a patient care report.
C 1.4.1.2 – Identify the general principles regarding the importance of EMS documentation and ways in which such documents are used.
C 1.4.1.3 – Describe the potential consequences of illegible, incomplete, or inaccurate documentation.
C 1.4.1.4 – Describe the special documentation considerations concerning patient refusal of care and/or transport.
C 1.4.1.5 – Describe the special considerations concerning mass casualty incidents or other unique reports.
P 1.4.1.6 – Demonstrate proper completion of a typical patient care report.
P 1.4.1.7 – Write legibly.
P 1.4.1.8 – Document communication accurately and concisely
P 1.4.1.9 – Use grammar and punctuation correctly.
P 1.4.1.10 – Use electronic resources and information technology (i.e., WARDS).

1.5 – EMS SYSTEM COMMUNICATION

1.5.1 – EMS Communication System

C 1.5.1.1 – Identify EMS communication system components.
C 1.5.1.2 – Describe proper radio communications between EMS providers and dispatch.

1.5.2 – Communicating with Other Health Care Professionals

C 1.5.2.1 – Explain factors related to effective communications with medical control.
C 1.5.2.2 – Explain the importance of proper communication with receiving facilities.
C 1.5.2.3 – Describe principles of communication system maintenance.
C 1.5.2.4 – Identify current and emerging technology used to collect and exchange patient and/or scene information electronically.

1.5.3 – Team Communication and Dynamics

C 1.5.3.1 – Identify the components of interpersonal communication transmission.

1.6 – THERAPEUTIC COMMUNICATION

1.6.1 – Principles of Communicating with Patients in a Manner that Achieves a Positive Relationship

C 1.6.1.1 – Identify strategies for developing rapport with the patient.
C 1.6.1.2 – Identify internal and external factors that affect an interview.
C 1.6.1.3 – Describe effective interviewing techniques and interactions.
C 1.6.1.4 – Discuss strategies for interviewing difficult patients (not motivated to talk).
C 1.6.1.5 – Define unique interviewing techniques for patients with special needs.
P 1.6.1.6 – Speak clearly.
A 1.6.1.7 – Listen actively.
A 1.6.1.8 – Adjust communication strategies based on the situation.
A 1.6.1.9 – Select vocabulary appropriate to the audience.

1.7 – MEDICAL/LEGAL AND ETHICS

1.7.1 – Consent/Refusal of Care

C 1.7.1.1 – Define consent to care.
C 1.7.1.2 – Define types of consent.
C 1.7.1.3 – Describe refusal of care and/or transportation.

1.7.2 – Confidentiality

C 1.7.2.1 – Discuss the obligation to protect patient information.
C 1.7.2.2 – Discuss HIPAA, its provisions, and its applicability/impact on EMS.
C 1.7.2.3 – Discuss confidentiality arising from the physician-patient relationship.
C 1.7.2.4 – Describe privileged communications.
C 1.7.2.5 – Explain possible repercussions for a breach of confidentiality.
A 1.7.2.6 – Demonstrate HIPAA compliance.
A 1.7.2.7 – Demonstrate confidentiality.

1.7.3 – Advanced Directives

C 1.7.3.1 – Explain advanced directives and how they impact patient care.

1.7.4 – Tort and Criminal Actions

C 1.7.4.1 – Describe basic legal concepts regarding the United Stated judiciary system.
C 1.7.4.2 – Describe specific crimes and their associated elements as related to EMS.
C 1.7.4.3 – Describe the elements of negligence, possible defenses to a claim, and potential limitations to civil liability.

1.7.5 – Statutory Responsibilities

C 1.7.5.1 – Discuss the Medical Practice Act.
C 1.7.5.2 – Discuss the legal implications of medical direction.
C 1.7.5.3 – Describe statutory duty to act.
A 1.7.5.4 – Practice within legal boundaries/requirements.

1.7.6 – Mandatory Reporting

C 1.7.6.1 – Identify when paramedics are legally compelled to notify the authorities.
C 1.7.6.2 – Discuss how reporting requirement arises from special relationship with patient.
C 1.7.6.3 – Describe legal liability for failure to report.

1.7.7 – Health Care Regulation

C 1.7.7.1 – Describe paramedic scope of practice.
C 1.7.7.2 – Differentiate between licensure and certification.
C 1.7.7.3 – Describe credentialing of paramedics.

1.7.8 – Patient Rights/Advocacy

C 1.7.8.1 – Identify patient rights inherent in providing EMS care.
C 1.7.8.2 – Describe how the paramedic serves as a patient advocate.

1.7.9 – End of Life Issues

C 1.7.9.1 – Discuss the concept of limited resuscitation efforts.
C 1.7.9.2 – Identify criteria for withholding resuscitation.
C 1.7.9.3 – Explain when to terminate resuscitation activities.
C 1.7.9.4 – Discuss organ donation as an end of life patient decision/option.

1.7.10 – Ethical Principles/Moral Obligations

C 1.7.10.1 – Define morals.
C 1.7.10.2 – Define ethics.

C 1.7.10.3 – Discuss the application of ethics and the use of ethical values.
C 1.7.10.4 – Examine ethical conflicts.
A 1.7.10.5 – Practice ethical behavior.

1.7.11 – Ethical Tests and Decision-Making

C 1.7.11.1 – Define ethical tests used in decision-making.

1.7.12 – Employment Law

C 1.7.12.1 – Discuss the impact of various employment laws on EMS.

2. 0 – ANATOMY AND PHYSIOLOGY

2.1 – ANATOMY AND PHYSIOLOGY

2.1.1 – Anatomical Terms

C 2.1.1.1 – Define anatomy.
C 2.1.1.2 – Define physiology.
C 2.1.1.3 – Define pathophysiology.
C 2.1.1.4 – Define homeostasis.
C 2.1.1.5 – Identify specific body parts and areas.

2.1.2 – Planes and Sections of the Body

C 2.1.2.1 – Identify the planes and sections of the body.

2.1.3 – Anatomical Topography

C 2.1.3.1 – Identify abdominal quadrants and regions.

2.1.4 – Organ Systems

C 2.1.4.1 – Distinguish between body organ systems.

2.1.5 – Anatomic Cavities

C 2.1.5.1 – Identify anatomic cavities.

2.1.6 – Organization

C 2.1.6.1 – Discuss cellular composition at the atomic level.
C 2.1.6.2 – Discuss cellular composition at the chemical level.

2.1.7 – Cell Structure and Function

C 2.1.7.1 – Discuss cell theory.
C 2.1.7.2 – Describe cellular anatomy and physiology.
C 2.1.7.3 – Explain cellular respiration.
C 2.1.7.4 – Describe the cellular environment.
C 2.1.7.5 – Describe cellular transport mechanisms.
C 2.1.7.6 – Discuss the process of cellular division.

2.1.8 – Tissue Level of Organization and Membranes

C 2.1.8.1 – List types of tissues and membranes.

2.1.9 – Skeletal System

C 2.1.9.1 – Describe the anatomy and physiology of the skeletal system.

2.1.10 – Muscular System

C 2.1.10.1 – Describe the anatomy and physiology of the muscular system.

2.1.11 – Respiratory System

C 2.1.11.1 – Describe the anatomy and physiology of the respiratory system.

2.1.12 – Circulatory System

C 2.1.12.1 – Describe the anatomy and physiology of the circulatory system.

2.1.13 – Nervous System

C 2.1.13.1 – Describe the anatomy and physiology of the nervous system.

2.1.14 – Integumentary System

C 2.1.14.1 – Describe the anatomy and physiology of the integumentary system.

2.1.15 – Digestive System

C 2.1.15.1 – Describe the anatomy and physiology of the digestive system.

2.1.16 – Endocrine System

C 2.1.16.1 – Describe the anatomy and physiology of the endocrine system.

2.1.17 – Renal System

C 2.1.17.1 – Describe the anatomy and physiology of the renal system.

2.1.18 – Reproductive System

C 2.1.18.1 – Describe the anatomy and physiology of the reproductive system for each gender.

2.1.19 – Lymphatic and Immune System

C 2.1.19.1 – Describe the anatomy and physiology of the lymphatic and immune system.

2.1.20 – Nutrition, Metabolism, and Body Temperature

C 2.1.20.1 – Describe the process by which the body regulates its internal temperature.
C 2.1.20.2 – Explain cellular respiration and metabolism.
C 2.1.20.3 – Discuss the functions of vitamins, minerals, and other important nutrients.

3.0 – MEDICAL TERMINOLOGY

3.1 – MEDICAL TERMINOLOGY

3.1.1 – Medical Terminology

C 3.1.1.1 – Explain the impact of utilizing proper medical terminology in both written and oral communications with colleagues and other health care professionals to ensure quality patient care.

4.0 – PATHOPHYSIOLOGY

4.1 – PATHOPHYSIOLOGY

4.1.1 – Introduction – Correlation of Pathophysiology with Disease Process

C 4.1.1.1 – Discuss the correlation of pathophysiology with disease processes.

4.1.2 – Basic Cellular Review

C 4.1.2.1 – Discuss the major classes of cells.
C 4.1.2.2 – Describe chief cellular functions.
C 4.1.2.3 – Describe cellular components, their structures, and functions.
C 4.1.2.4 – Identify different tissue types.

4.1.3 – Alterations in Cells and Tissues

C 4.1.3.1 – Discuss types of cellular adaptation.
C 4.1.3.2 – Describe the ways in which cellular injury occurs.
C 4.1.3.3 – Discuss the manifestation of cellular injury.
C 4.1.3.4 – Describe cellular death / necrosis.

4.1.4 – The Cellular Environment

C 4.1.4.1 – Describe the distribution of body fluids.
C 4.1.4.2 – Discuss the impact aging has on the distribution of body fluids.
C 4.1.4.3 – Describe the way in which water moves between intracellular fluid and extracellular fluid.
C 4.1.4.4 – Describe the way in which water moves between plasma and interstitial fluid.
C 4.1.4.5 – Explain alterations in water movement within the body (edema).
C 4.1.4.6 – Describe water balance and the role of electrolytes.
C 4.1.4.7 – Describe the acid-base balance within the body.

4.1.5 – Genetics and Familial Diseases

C 4.1.5.1 – Identify factors that cause disease.
C 4.1.5.2 – Analyze disease risk.
C 4.1.5.3 – Describe the combined effects and interaction among risk factors.
C 4.1.5.4 – Describe familial disease and associated risk factors.

4.1.6 – Hypoperfusion

C 4.1.6.1 – Describe the pathogenesis of hypoperfusion.
C 4.1.6.2 – Differentiate between the different types of shock, their pathophysiology, evaluation, and treatment.
C 4.1.6.3 – Explain multiple organ dysfunction syndrome ("MODS").
C 4.1.6.4 – Describe the cellular metabolism impairment that occurs as a result of hypoperfusion.

4.1.7 – Self-Defense Mechanisms

C 4.1.7.1 – Identify the lines of defense in protecting the body from disease and injury.
C 4.1.7.2 – Describe the characteristics of the immune response.
C 4.1.7.3 – Discuss, in general / introductory terms, the immune response.
C 4.1.7.4 – Describe humoral immune response.
C 4.1.7.5 – Describe cell-mediated immune response.
C 4.1.7.6 – Explain cellular interactions in the immune response.
C 4.1.7.7 – Discuss fetal and neonatal immune function.
C 4.1.7.8 – Discuss aging and its affects on the immune response in the elderly.

4.1.8 – Inflammation

C 4.1.8.1 – Describe the acute inflammatory response.
C 4.1.8.2 – Discuss mast cells and their role in the inflammatory response.
C 4.1.8.3 – Discuss plasma protein systems.

C 4.1.8.4 – Discuss the role of cellular components as part of the inflammation response.
C 4.1.8.5 – Discuss the role of cellular products as part of the inflammation response.
C 4.1.8.6 – Describe systemic responses to acute inflammation.
C 4.1.8.7 – Discuss chronic inflammation responses.
C 4.1.8.8 – Describe local inflammation responses.
C 4.1.8.9 – Discuss phases of resolution and repair.
C 4.1.8.10 – Discuss the effect of age-related self-defense mechanisms on the inflammatory process.

4.1.9 – Variances In Immunity and Inflammation

C 4.1.9.1 – Discuss hypersensitivity (allergy, autoimmunity, and isoimmunity).
C 4.1.9.2 – Discuss immunity and inflammation deficiencies.

4.1.10 – Stress and Disease

C 4.1.10.1 – Discuss concepts related to stress.
C 4.1.10.2 – Discuss stress responses.
C 4.1.10.3 – Discuss the interrelationships between stress, coping, and illness.

5.0 – LIFE SPAN DEVELOPMENT

5.1 – LIFE SPAN DEVELOPMENT

5.1.1 – Infancy (Birth to One Year)

C 5.1.1.1 – Discuss the physiological and psychosocial characteristics of infants.

5.1.2 – Toddler (12 Months to 36 Months) and Pre-School Age (Three to Five Years)

C 5.1.1.2 - Discuss the physiological and psychosocial characteristics of toddlers and pre-school age children.

5.1.3 – School Age Children (Six to 12 Years)

C 5.1.3.1 - Discuss the physiological and psychosocial characteristics of school age children.

5.1.4 – Adolescence (13 to 18 Years)

C 5.1.3.1 - Discuss the physiological and psychosocial characteristics of adolescents.

5.1.5 – Early Adulthood (19 to 40 Years)

C 5.1.5.1 - Discuss the physiological and psychosocial characteristics of individuals in early adulthood.

5.1.6 – Middle Adulthood (41 to 60 Years)

C 5.1.6.1 - Discuss the physiological and psychosocial characteristics of individuals in middle adulthood.

5.1.7 – Late Adulthood (61 Years and Older)

C 5.1.7.1 - Discuss the physiological and psychosocial characteristics of individuals in late adulthood.

6.0 – PUBLIC HEALTH

6.1 – PUBLIC HEALTH

6.1.1 – Basic Principles of Public Health

C 6.1.1.1 – Discuss role of public health in our society.
C 6.1.1.2 – Discuss public health laws, regulations, and guidelines.
C 6.1.1.3 – Examine how EMS interfaces with public health.

7.0 – PHARMACOLOGY

7.1 – PRINCIPLES OF PHARMACOLOGY

7.1.1 – Medication Safety

C 7.1.1.1 – Describe the importance of medication safety in providing quality EMS care.

7.1.2 – Medication Legislation

C 7.1.2.1 – Describe legislative acts controlling drug use and abuse in the United States.

7.1.3 – Naming

C 7.1.3.1 – Differentiate between the chemical, generic (nonproprietary), official (USP), and trade (proprietary) names of a drug.
C 7.1.3.2 – List authoritative sources of drug information.

7.1.4 – Classifications

C 7.1.4.1 – List the classifications of drugs based upon either mechanism of action or the body system affected.

7.1.5 – Schedules

C 7.1.5.1 – Differentiate between the substances included in Schedules I through V of the Controlled Substances Act.

7.1.6 – Drug Storage and Security

C 7.1.6.1 – Discuss factors affecting drug potency.
C 7.1.6.2 – Discuss considerations for storing and securing medications and controlled substances.

7.1.8 – Phases of Medication Activity
C 7.1.8.1 – List the phases of medication activity.
7.1.9 – Medication Interactions
C 7.1.9.1 – Describe various medication interactions.
7.1.10 – Toxicity
C 7.1.10.1 – Describe toxicity concerns regarding medication administration.
7.1.11 – Drug Terminology
C 7.1.11.1 – Define pertinent terms related to EMS utilization and administration of drugs.
7.1.12 – Sources of Drugs
C 7.1.12.1 – List the four main sources of drug products.
C 7.1.12.2 – List the physical forms of various drug products.
7.1.13 – Pharmacological Concepts
C 7.1.13.1 – Discuss the processes of pharmacokinetics and pharmacodynamics.

7.2 – MEDICATION ADMINISTRATION
7.2.1 – Routes of Administration
C 7.2.1.1 – Differentiate between the percutaneous and parenteral routes of medication administration.
P 7.2.1.2 – Apply vascular access procedures.
7.2.2 – Administration of Medication to a Patient
C 7.2.2.1 – Identify the six "rights" of drug administration.
P 7.2.2.2 – Demonstrate proficiency in calculating drug dosages.
C 7.2.2.3 – Explain the proper technique for administering medications via various routes (include advantages and disadvantages associated with each route).
C 7.2.2.4 – Explain the need for patient reassessment after medication administration.
C 7.2.2.5 – Describe the need for proper documentation of medication administration activities.
P 7.2.2.6 – Apply appropriate use of pharmacology.
P 7.2.2.7 – Administer medications.
7.2.3 – Standardization of Drugs
C 7.2.3.1 – Discuss standardization of drugs.
7.2.4 – Medication Classifications
C 7.2.4.1 – Describe how drugs are classified.

7.3 – EMERGENCY MEDICATIONS
7.3.1 – Specific Medications
C 7.3.1.1 – List the names, mechanism of action, indications, contraindications, complications, routes of administration, side effects, interactions, doses, and any specific administration considerations for medications and intravenous fluids available for administration within the paramedic scope of practice.

8.0 – AIRWAY MANAGEMENT, RESPIRATION, AND ARTIFICIAL VENTILATION

8.1 – AIRWAY MANAGEMENT
8.1.1 – Airway Anatomy
C 8.1.1.1 – Describe the anatomy of the respiratory system.
8.1.2 – Airway Assessment
C 8.1.2.1 – Describe assessment of the airway and the respiratory system.
8.1.3 – Techniques of Assuring a Patent Airway
C 8.1.3.1 – Describe indications, contraindications, advantages, disadvantages, complications, equipment, and techniques used to ensure a patent airway.
P 8.1.3.2 – Apply airway management procedures (refer to Wisconsin Scope of Practice).
8.1.4 – Consider Age-Related Variations in Pediatric and Geriatric Patients
C 8.1.4.1 – Compare ventilation techniques used for an adult patient to those used for pediatric patients.
C 8.1.4.2 – Describe special considerations in airway management and ventilation for the pediatric patient.

8.2 – RESPIRATION
8.2.1 – Anatomy of the Respiratory System
C 8.2.1.1 – See 8.1.1
8.2.2 – Physiology of Respiration
C 8.2.2.1 – Discuss the means by which the body controls respiration.
C 8.2.2.2 – Explain the mechanics of respiration.

C 8.2.2.3 – Identify blood volume circulation disturbances due to cardiac, trauma, or systemic vascular resistance.
C 8.2.2.4 – Describe cardiac output and its role in adequate circulation maintenance.
C 8.2.2.5 – Discuss respiratory buffer systems.

8.2.3 – Pathophysiology of Respiration

C 8.2.3.1 – List reasons for interruption of pulmonary ventilation.
C 8.2.3.2 – Discuss causes for interruption of oxygenation.
C 8.2.3.3 – List reasons for inadequate respiration.
C 8.2.3.4 – Discuss rapid ventilation, exhaustion, and dead space air movement as contributory factors for inadequate respiration.
C 8.2.3.5 – Identify possible mechanical ventilation problems resulting in inadequate respiration.
C 8.2.3.6 – Discuss concerns regarding breathing against an elevated diaphragm.
C 8.2.3.7 – Discuss pneumonia, emphysema, and trauma as they relate to a decrease in lung compliance.
C 8.2.3.8 – Discuss the concept of ventilation-perfusion mismatch.
C 8.2.3.9 – Discuss disruptions in oxygen transport associated with diminished oxygen carrying capacity.
C 8.2.3.10 – List causes for disruption in effective circulation.
C 8.2.3.11 – Identify disruptions that can occur at the cellular level to impede adequate respiration.

8.2.4 – Assessment of Adequate and inadequate Respiration

C 8.2.4.1 – Discuss the use of capnometry/capnography to assess adequate or inadequate respiration.

8.2.5 – Management of Adequate and Inadequate Respiration

C 8.2.5.1 – Discuss the maintenance of adequate respiration given a respiratory compromise.

8.2.6 – Supplemental Oxygen Therapy

C 8.2.6.1 – Discuss oxygen administration for the patient with hypercapnia.

8.2.7 – Age-Related Variations in Pediatric and Geriatric Patients

C 8.2.7.1 – Describe special considerations in airway management and ventilation for pediatric patients.

8.3 – ARTIFICIAL VENTILATION

8.3.1 – Comprehensive Ventilation Assessment

C 8.3.1.1 – Explain the purpose of conducting a comprehensive ventilation assessment.
C 8.3.1.2 – Describe the procedures inherent in conducting a comprehensive ventilation assessment.
C 8.3.1.3 – Define minute volume.
C 8.3.1.4 – Define alveolar volume.
C 8.3.1.5 – Describe the process of, and tools used in, evaluating the effects of artificial ventilation.

8.3.2 – Review of Ventilation Devices Used by EMRs, EMTs, and AEMTs

C 8.3.2.1 – Discuss the ventilation devices included within the scopes of practice for the EMR, EMT, and AEMT levels.

8.3.3. – Assisting Patient Ventilations

C 8.3.3.1 – Discuss the techniques utilized by EMRs, EMTs, and AEMTs to assist patient ventilations.
C 8.3.3.2 – Differentiate between normal and positive ventilation and the physiologic differences associated with each.
C 8.3.3.3 – Discuss the use of BiPAP/CPAP in assisting patient ventilations.
C 8.3.3.4 – Discuss the use of PEEP in assisting patient ventilations.

8.3.4 – Age-Related Variations in Pediatric and Geriatric Patients

C 8.3.4.1 – Identify age-related variations in providing artificial ventilations to pediatric and geriatric patients.

9.0 – PATIENT ASSESSMENT

9.1 – SCENE SIZE-UP

9.1.1 – Scene Safety

C 9.1.1.1 – Identify common scene hazards encountered by paramedics.
C 9.1.1.2 – Discuss the process of evaluating a scene for safety.

9.1.2 – Scene Management

C 9.1.2.1 – Discuss the impact of the environment on patient care.
C 9.1.2.2 – Discuss techniques the paramedic could employ to address scene hazards.
C 9.1.2.3 – Discuss means by which the paramedic can protect himself or herself from on-scene violence.
C 9.1.2.4 – Discuss instances in which additional or specialized resources may be necessary to mitigate on-scene hazards.
C 9.1.2.5 – Discuss standard precautions utilized to protect patients and responders alike from transmissible infectious agents.
C 9.1.2.6 – Discuss scene management given multiple patients.

P 9.1.2.7 – Coordinate scene safety.

9.2 – PRIMARY ASSESSMENT

9.2.1 – Primary Survey/Primary Assessment

C 9.2.1.1 – List the criteria to be evaluated during the primary survey/assessment of a patient.
A 9.2.1.2 – Demonstrate an understanding of basic patient needs.
P 9.2.1.3 – Demonstrate appropriate primary survey/assessment of a patient.
P 9.2.1.4 – Formulate field impression(s).
P 9.2.1.5 – Formulate a working diagnosis.

9.2.2 – Integration of Treatment/Procedures Needed to Preserve Life

C 9.2.2.1 – Discuss the need to integrate treatment or procedures necessary to preserve life when performing a primary survey/assessment of a patient.
P 9.2.2.2 – Formulate patient treatment plan(s).
P 9.2.2.3 – Implement patient treatment plan(s).

9.2.3 – Evaluating Priority of Patient Care and Transport

C 9.2.3.1 – Discuss the assignment of priority of patient care and transport based upon primary survey/assessment findings.

9.3 – HISTORY TAKING

9.3.1 – Components of the Patient History

C 9.3.1.1 – Describe the purpose of obtaining a patient history.
C 9.3.1.2 – Discuss potential barriers to and techniques for obtaining a patient history.

9.3.2 – Interviewing Techniques

C 9.3.2.1 – Identify strategies for developing rapport with the patient ("setting the stage").
C 9.3.2.2 – Discuss interviewing techniques to assist in learning about the patient's present illness.
C 9.3.2.3 – Discuss the purpose of direct questions and the techniques employed in asking direct questions.
C 9.3.2.4 – Discuss considerations in obtaining a history pertaining to sensitive topics.
C 9.3.2.5 – Identify considerations pertaining to obtaining a history in trauma patients.

9.3.3 – Components of the Patient History

C 9.3.3.1 – Identify the components of a patient history.

9.3.4 – Cultural Competence

C 9.3.4.1 – Discuss cross-cultural interviewing considerations.

9.3.5 – Special Challenges

C 9.3.5.1 – Discuss special challenges in obtaining a patient history.

9.3.6 – Integration of Therapeutic Communication, History Taking Techniques, Patient Presentation, and Assessment Findings (Development of Field Impression)

C 9.3.6.1 – Discuss the fundamental elements of critical thinking for paramedics to develop a field impression of the patient given the integration of therapeutic communication, history taking techniques, patient presentation, and assessment findings.

9.3.7 – Treatment Plan (Modify Initial Treatment Plan)

C 9.3.7.1 – Summarize the "six Rs" of putting it all together to develop and implement a treatment plan based upon the field impression.

9.3.8 – Age-Related Considerations

C 9.3.8.1 – Discuss considerations when obtaining a history for a pediatric patient.
C 9.3.8.2 – Discuss considerations when obtaining a history for a geriatric patient.

9.4 – SECONDARY ASSESSMENT

9.4.1 – Techniques of Physical Examination

C 9.4.1.1 – List major body systems.
C 9.4.1.2 – List major anatomical regions.

9.4.2 – Physical Examination Techniques Will Vary from Patient to Patient Depending on the Chief Complaint, Present Illness, and History

C 9.4.2.1 – Discuss the need to employ different physical examination techniques given differences in patients and their chief complaints, present illnesses, and histories.

9.4.3 – Physical Examination (Approach and Overview)

C 9.4.3.1 – Define various physical examination techniques.
C 9.4.3.2 – Discuss the general approach to be taken in conducting a physical examination of a patient.
C 9.4.3.3 – List the categories of a comprehensive physical examination.

9.4.4 – Mental Status

C 9.4.4.1 – Describe the examination of a patient's mental status.

9.4.5 – Techniques of Physical Exam: General Survey

C 9.4.5.1 – Discuss the techniques used in conducting a general survey physical examination.

9.4.6 – Vital Signs

C 9.4.6.1 – Identify vital signs commonly obtained during a physical examination.

9.4.7 – Examination by Anatomical Region or System

C 9.4.7.1 – Discuss the examination of the body by region/system to include normal findings, abnormal findings, and the significance of any abnormal findings.

P 9.4.7.2 – Demonstrate an appropriate secondary assessment/survey of a patient.

9.4.8 – Modifying the Assessment for the Patient with a Life-Threatening Emergency

C 9.4.8.1 – Discuss how the assessment process is modified when a patient has a life-threatening emergency.

9.5 – MONITORING DEVICES

9.5.1 – Continuous ECG Monitoring

C 9.5.1.1 – Discuss the purpose, indications, procedures, and limitations of continuous ECG monitoring.

9.5.2 – 12-Lead ECG Interpretation

C 9.5.2.1 – Discuss the purpose, indications, and procedures of 12-lead ECG interpretation.

9.5.3 – Carbon Dioxide Monitoring

C 9.5.3.1 – Discuss the purpose, indications, procedures, and limitations of carbon dioxide monitoring.

9.5.4 – Basic Blood Chemistry

C 9.5.4.1 – Discuss the purpose, indications, procedures, and limitations of basic blood chemistry analyses.

9.5.5 – Other Monitoring Devices

C 9.5.5.1 – Discuss other monitoring devices available for use at the paramedic level.

9.6 – REASSESSMENT

9.6.1 – How and When to Reassess

C 9.6.1.1 – Discuss how and when to reassess a patient.

9.6.2 – Patient Evaluation: Reassessment

C 9.6.2.1 – Discuss the reassessment process.

P 9.6.2.2 – Reevaluate the effectiveness of treatment plan(s) (modify as necessary based upon re-evaluation).

9.6.3 – Documentation

C 9.6.2.2 – Discuss the need to document reassessment findings.

9.6.4 – Age-Related Considerations

C 9.6.4.1 – Identify age-related considerations for reassessing pediatric and geriatric patients.

10.0 – MEDICINE

10.1 – MEDICAL OVERVIEW

10.1.1 – Assessment Factors

C 10.1.1.1 – Summarize assessment factors to be considered in developing a comprehensive treatment / disposition plan for a patient with a medical complaint.

10.1.2 – Major Components of the Patient Assessment

C 10.1.2.1 – Identify the major components of a patient assessment.

10.1.3 – Forming a Field Impression

C 10.1.3.1 – Discuss the process of forming a field impression based upon assessment findings.

10.2 – NEUROLOGY

10.2.1 – Introduction (Overview of Neurological Conditions)

C 10.2.1.1 – Discuss the morbidity/mortality, preventative strategies, and pathophysiology of neurological conditions.

10.2.2 – Central Nervous System

C 10.2.2.1 – Discuss the anatomy and physiology of the nervous system.

10.2.3 – Neurological Assessment (Normal and Abnormal Findings)

C 10.2.3.1 – Discuss potential normal and abnormal findings from a neurological assessment of a patient.

10.2.4 – General Management Considerations

C 10.2.4.1 – Discuss general management conditions for patients with a neurological emergency.

10.2.5 – Neurological Conditions

C 10.2.5.1 – Discuss the epidemiology, pathophysiology, potential assessment findings, and management of commonly encountered neurological emergencies.

10.2.6 – Age-Related Variations

C 10.2.6.1 – Identify differences in neurological emergencies affecting pediatric and geriatric patients.

10.2.7 – Communication and Documentation

C 10.2.7.1 – Discuss communication and documentation considerations for patients with neurological emergencies.

10.2.8 – Transport Decisions

C 10.2.8.1 – Discuss transport considerations for patients with neurological emergencies.

10.2.9 – Patient Education and Prevention of Complications or Future Neurological Emergencies

C 10.2.9.1 – Discuss patient education and prevention of complications or future neurological emergencies.

10.3 – ABDOMINAL AND GASTROINTESTINAL DISORDERS

10.3.1 – Introduction

C 10.3.1.1 - Discuss the morbidity/mortality, risk factors, and preventative strategies associated with abdominal and gastrointestinal disorders.

10.3.2 – General Pathophysiology, Assessment, and Management

C 10.3.2.1 – Discuss the pathophysiology of abdominal pain.

C 10.3.2.2 – Discuss assessment findings as related to the patient with an abdominal or gastrointestinal emergency.

C 10.3.2.3 – Discuss the management and treatment of patients with an abdominal or gastrointestinal emergency.

10.3.3 – Specific Injuries/Illness: Causes, Assessment Findings, and Management for Each Condition

C 10.3.3.1 – Discuss the pathophysiology, potential assessment findings, and management of commonly encountered abdominal and gastrointestinal emergencies.

10.3.4 – Consider Age-Related Variations

C 10.3.4.1 - Identify differences in abdominal and gastrointestinal emergencies affecting pediatric and geriatric patients.

10.3.5 – Communication and Documentation

C 10.3.5.1 - Discuss communication and documentation considerations for patients with abdominal and gastrointestinal emergencies.

10.3.6 – Transport Decisions

C 10.3.6.1 - Discuss transport considerations for patients with abdominal and gastrointestinal emergencies.

10.3.7 – Patient Education and Prevention

C 10.3.7.1 - Discuss patient education and prevention of complications or future abdominal or gastrointestinal emergencies

10.4 – IMMUNOLOGY

10.4.1 – Introduction

C 10.4.1.1 - Discuss the morbidity/mortality, preventative strategies, and pathophysiology of immunology conditions.

10.4.2 – Pathophysiology

C 10.4.2.1 – Discuss the pathophysiology of immunology emergencies.

10.4.3 – Assessment

C 10.4.3.1 – Discuss the assessment of a patient suffering from an allergic reaction.

10.4.4 – Anaphylactoid Reaction

C 10.4.4.1 – Describe the anaphylactoid reaction process.

10.4.5 – Managing an Allergic Reaction

C 10.4.5.1 – Discuss the management of a patient suffering from an allergic reaction.

10.4.6 – Collagen Vascular Disease

C 10.4.6.1 – Discuss collagen vascular disease.

10.4.7 – Transplant-Related Problems

C 10.4.7.1 – Discuss transplant-related problems.

10.4.8 – Consider Age-Related Variations in Pediatric and Geriatric Patients

C 10.4.8.1 - Identify differences in immunology emergencies affecting pediatric and geriatric patients.

10.4.9 – Communication and Documentation

C 10.4.9.1 - Discuss communication and documentation considerations for patients with immunology emergencies.

10.4.10 – Transport Decisions

C 10.4.10.1 - Discuss transport considerations for patients with immunology emergencies.

10.4.11 – Patient Education and Prevention

C 10.4.11.1 - Discuss patient education and prevention of complications or future immunology emergencies.

10.5 – INFECTIOUS DISEASES

10.5.1 – Public Health Principles and Agencies Responsible for Public Health

C 10.5.1.1 – Discuss public health principles relevant to infectious/communicable diseases.

C 10.5.1.2 – Identify public health agencies involved in the prevention and management of disease outbreaks.

10.5.2 – Pathophysiology of Infectious Disease

C 10.5.2.1 – Discuss the pathophysiology of infectious disease.

10.5.3 – Standard Precautions, Personal Protective Equipment, and Cleaning and Disposing of Equipment and Supplies

C 10.5.3.1 – Discuss techniques employed by paramedics to limit or prevent the spread of infectious diseases.

P 10.5.3.2 – Demonstrate use of personal protective equipment.

P 10.5.3.3 – Protect self and others from bloodborne pathogens and infectious disease.

10.5.4 – Specific Diseases and Conditions

C 10.5.4.1 - Discuss the pathophysiology, potential assessment findings, and management of commonly encountered infectious disease emergencies

10.5.5 – Consider Age-Related Variations in Pediatric and Geriatric Patients

C 10.5.5.1 - Identify differences in infectious disease emergencies affecting pediatric and geriatric patients.

10.5.6 – Communication and Documentation for a Patient with a Communicable or Infectious Disease

C 10.5.6.1 - Discuss communication and documentation considerations for patients with infectious disease emergencies.

10.5.7 – Transport Decisions Including Special Infection Control Procedures

C 10.5.7.1 - Discuss transport considerations and procedures for patients with infectious disease emergencies.

10.5.8 – Patient and Family Teaching Regarding Communicable or Infectious Diseases and Their Spread

C 10.5.8.1 - Discuss patient and family member education and prevention of complications or future infectious disease emergencies.

10.5.9 – Legal Requirements Regarding Reporting Communicable or Infectious Diseases/Conditions

C 10.5.9.1 – Discuss the legal requirements for reporting of communicable or infectious diseases or conditions.

10.6 – ENDOCRINE DISORDERS

10.6.1 – Overview of Endocrine Conditions

C 10.6.1.1 – Discuss the anatomy and physiology of the endocrine glands, including the hormones produced within the various glands.

10.6.2 – Pathophysiology, Causes, Incidence, Morbidity, and Mortality, Assessment Findings, Management for Endocrine Conditions

C 10.6.2.1 - Discuss the morbidity/mortality, preventative strategies, pathophysiology, assessment findings, and management of endocrine emergencies.

10.6.3 – Consider Age-Related Variations

C 10.6.3.1 - Identify differences in endocrine emergencies affecting pediatric and geriatric patients.

10.6.4 – Communication and Documentation

C 10.6.4.1. - Discuss communication and documentation considerations for patients with endocrine emergencies.

10.6.5 – Transport Decisions

C 10.6.5.1 - Discuss transport considerations for patients with endocrine emergencies.

10.6.6 – Patient Education and Prevention

C 10.6.6.1 - Discuss patient education and prevention of complications or future endocrine emergencies.

10.7 – PSYCHIATRIC

10.7.1 – Introduction

C 10.7.1.1 – Discuss the prevalence of behavioral and psychiatric disorders, the medical legal considerations for the management of patients with such disorders, and the importance of ensuring safety (patient, providers, and others) while assisting these patients.

10.7.2 – Pathophysiology

C 10.7.2.1 – Discuss the pathophysiology of behavioral and psychiatric disorders.

10.7.3 – Understanding Behavior
C 10.7.3.1 – Define different types of behavior.
10.7.4 – Acute Psychosis
C 10.7.4.1 – Discuss the pathophysiology, signs and symptoms, and prehospital management of acute psychosis.
10.7.5 – Agitated Delirium
C 10.7.5.1 – Discuss the pathophysiology, risk factors, signs and symptoms, and management of agitated delirium.
10.7.6 – Specific Behavioral/Psychiatric Disorders
C 10.7.6.1 – Differentiate between different behavioral/psychiatric disorders.
10.7.7 – Assessment Findings for Behavioral/Psychiatric Patients
C 10.7.7.1 – Discuss potential assessment findings for behavioral/psychiatric patients.
10.7.8 – Providing Empathetic and Respectful Management
C 10.7.8.1 – Discuss techniques for providing empathetic and respectful management of patients experiencing a behavioral emergency.
10.7.9 – Medications
C 10.7.9.1 – Discuss medications used in the management of behavioral/psychiatric disorders, problems associated with non-compliance, and those available for emergency use by paramedics.
10.7.10 – Consider Age-Related Variations in Pediatric and Geriatric Patients
C 10.7.10.1 - Identify differences in behavioral emergencies affecting pediatric and geriatric patients.
10.7.11 – Communication to Medical Facility and Documentation
C 10.7.11.1 - Discuss communication and documentation considerations for patients with behavioral emergencies.
10.7.12 – Transport Decisions
C 10.7.12.1 - Discuss transport considerations for patients with behavioral emergencies.
10.8 – CARDIOVASCULAR
10.8.1 – Anatomy of the Cardiovascular System
C 10.8.1.1 – Describe the anatomy of the cardiovascular system.
10.8.2 – Physiology
C 10.8.2.1 – Describe the physiology of the cardiovascular system.
10.8.3 – Electrophysiology
C 10.8.3.1 – Discuss the electrophysiology of the cardiovascular system.
10.8.4 – Epidemiology
C 10.8.4.1 – Discuss the incidence, morbidity/mortality, risk factors, and possible contributing risks associated with cardiovascular disease, along with prevention strategies that may reduce the morbidity and mortality of cardiovascular disease.
10.8.5 – Primary Survey for Cardiovascular Assessment
C 10.8.5.1 – Discuss the primary survey as applied to a cardiovascular assessment.
10.8.6 – History and Physical/SAMPLE Format
C 10.8.6.1 – Discuss the history and physical/SAMPLE format as applied to a cardiovascular assessment.
10.8.7 – Secondary Survey for Cardiovascular Assessment
C 10.8.7.1 - Discuss the secondary survey as applied to a cardiovascular assessment.
10.8.8 – Electrocardiographic (ECG) Monitoring
C 10.8.8.1 – Discuss the electrophysiology of the heart.
C 10.8.8.2 – Describe proper placement of ECG leads/electrodes.
C 10.8.8.3 – Describe the ways in which ECG outputs/strips are standardized.
C 10.8.8.4 – Describe the ECG waveform and its analysis.
C 10.8.8.5 – Describe the heart surfaces shown by each lead system.
C 10.8.8.6 – Describe the steps used to analyze and interpret an ECG.
P 10.8.8.7 – Identify cardiac arrhythmias.
P 10.8.8.8 – Apply ECG procedures.
10.8.9 – Management of the Patient with an Arrhythmia
C 10.8.9.1 – Discuss possible assessment findings of a patient with a cardiac arrhythmia.
C 10.8.9.2 – Identify pharmacological interventions available for the treatment of cardiac arrhythmias.
C 10.8.9.3 – Discuss electrical interventions available for the treatment of cardiac arrhythmias.
C 10.8.9.3 – Discuss transport considerations for a patient with a cardiac arrhythmia.

C 10.8.9.4 – Discuss support and communication strategies when addressing the patient, family members, medical direction, the receiving facility, and others.
P 10.8.9.5 – Apply electrical therapy.
P 10.8.9.6 – Apply "mechanical" (non-electrical) cardiovascular interventions.

10.8.10 – Acute Coronary Syndrome

C 10.8.10.1 - Discuss the precipitating causes, morbidity/mortality, pathophysiology, assessment findings, management, and communication strategies associated with acute coronary syndrome.

10.8.11 – Acute Myocardial Infarction/Angina

C 10.8.11.1 - Discuss the precipitating causes, morbidity/mortality, pathophysiology, assessment findings, management, and communication strategies associated with acute myocardial infarction/angina.

10.8.12 – Heart Failure

C 10.8.12.1 - Discuss the precipitating causes, morbidity/mortality, pathophysiology, assessment findings, management, and communication strategies associated with heart failure.

10.8.13 – Non-Traumatic Cardiac Tamponade

C 10.8.13.1 - Discuss the precipitating causes, morbidity/mortality, pathophysiology, assessment findings, management, and communication strategies associated with non-traumatic cardiac tamponade.

10.8.14 – Hypertensive Emergencies

C 10.8.14.1 - Discuss the precipitating causes, morbidity/mortality, pathophysiology, assessment findings, management, and communication strategies associated with hypertensive emergencies.

10.8.15 – Cardiogenic Shock

C 10.8.15.1 - Discuss the precipitating causes, morbidity/mortality, pathophysiology, assessment findings, management, and communication strategies associated with cardiogenic shock.

10.8.16 – Cardiac Arrest

C 10.8.16.1 - Discuss the precipitating causes, morbidity/mortality, pathophysiology, assessment findings, management, and communication strategies associated with cardiac arrest.

10.8.17 – Vascular Disorders

C 10.8.17.1 - Discuss the precipitating causes, morbidity/mortality, pathophysiology, assessment findings, management, and communication strategies associated with vascular disorders.

10.8.18 – Aortic Aneurysm/Dissection

C 10.8.18.1 – Describe an aortic aneurysm/dissection.

10.8.19 – Thromboembolism

C 10.8.19.1 – Describe a thromboembolism.

10.8.20 – Congenital Heart Disease

C 10.8.20.1 – Discuss congenital heart disease.

10.8.21 – Valvular Heart Disease

C 10.8.21.1 – Describe valvular heart disease.

10.8.22 – Coronary Artery Disease

C 10.8.22 – Discuss coronary artery disease.

10.8.23 – Infectious Diseases of the Heart

C 10.8.23.1 – Discuss infectious diseases of the heart.

10.8.24 – Cardiomyopathy

C 10.8.24.1 – Describe cardiomyopathy.

10.8.25 – Specific Hypertensive Emergencies

C 10.8.25.1 – List specific hypertensive emergencies.

10.8.26 – Infectious Diseases of the Heart

C 10.8.26.1 - Discuss the precipitating causes, morbidity/mortality, pathophysiology, assessment findings, and management of infectious diseases of the heart.

10.8.27 – Congenital Abnormalities and Age-Related Variations

C 10.8.27.1 - Discuss the precipitating causes, morbidity/mortality, pathophysiology, assessment findings, and management of congenital cardiac abnormalities, including age-related variations.

10.8.28 – Integration

P 10.8.28.1 – Apply pathophysiological principles to the assessment of a patient with cardiovascular disease.
P 10.8.28.2 – Formulate a field impression for a patient with cardiovascular disease.
P 10.8.28.3 – Develop a patient management plan based on the field impression.
P 10.8.28.3 – Execute a patient management plan based on the field impression

10.9 – TOXICOLOGY

10.9.1 – Epidemiology of Toxicology Emergencies

C 10.9.1.1 – Discuss the epidemiology of toxicology, including types of emergencies, pharmacokinetics, and routes of exposure.

10.9.2 – Toxic Syndromes (Toxidromes) Including Drugs of Abuse

C 10.9.2.1 – Discuss the pathophysiology, incidence, risk factors, methods of transmission, complications, assessment findings, and patient management considerations associated with toxic syndromes.

10.9.3 – Alcoholism

C 10.9.3.1 - Discuss the pathophysiology, incidence, risk factors, morbidity/mortality, complications, assessment findings, and patient management considerations associated with alcoholism.

10.9.4 – Poisonings and Exposures

C 10.9.4.1 – Discuss potential chemicals, assessment findings and symptoms, and management considerations associated with chemical poisoning and exposures.

10.9.5 – Household Poisons

C 10.9.5.1 - Discuss potential agents, assessment findings and symptoms, and management considerations associated with household poison/chemical exposures.

10.9.6 – Medication Overdose (Introduction: Pathophysiology, Incidence, Toxic Agents, Risk Factors, and Complications)

C 10.9.6.1 - Discuss the pathophysiology, incidence, risk factors, complications, assessment findings, and patient management considerations associated with a medication overdose.

10.9.7 – General Treatment Modalities for Poisonings

C 10.9.7.1 – Discuss general treatment modalities for poisoning emergencies.

10.9.8 – Communication and Documentation for Patients with Toxicological Emergencies

C 10.9.8.1 – Discuss communication and documentation considerations for patients with toxicological emergencies.

10.9.9 – Transport Decisions with Toxicological Emergencies

C 10.9.9.1 – Discuss transport considerations for patients with toxicological emergencies.

10.9.10 – Age-Related Variations for Pediatric and Geriatric Patients

C 10.9.10.1 - Identify differences in toxicological emergencies affecting pediatric and geriatric patients.

10.9.11 – Patient Education and Prevention of Toxicological Emergencies and Drug and Alcohol Abuse

C 10.9.11.1 – Discuss patient education and prevention of complications or future toxicological emergencies.

10.10 – RESPIRATORY

10.10.1 – Introduction

C 10.10.1.1 – Discuss the epidemiology of pulmonary diseases and conditions.

C 10.10.1.2 – Identify the structures (and respective functions) of the pulmonary system

10.10.2 – General System Pathophysiology, Assessment, and Management

C 10.10.2.1 – Discuss the pathophysiology of specific respiratory emergencies/conditions.

C 10.10.2.2 – Discuss potential assessment findings for a patient suffering from a respiratory emergency/condition.

C 10.10.2.3 - Discuss the prehospital management of a patient suffering from a respiratory emergency/condition

10.10.3 – Specific Illness/Injuries: Causes, Assessment Findings, and Management for Each Condition

C 10.10.3.1 – Discuss the causes, assessment findings, and management of specific respiratory emergencies/conditions.

10.10.4 – Consider Age-Related Variations

C 10.10.4.1 – Discuss differences in respiratory emergencies/conditions affecting pediatric patients.

10.10.5 – Communication and Documentation for Patients with a Respiratory Condition or Emergency

C 10.10.5.1 – Discuss communication and documentation considerations for patients with respiratory emergencies/conditions.

10.10.6 – Transport Decisions

C 10.10.6.1 – Discuss transport considerations for patients with respiratory emergencies/conditions.

10.10.7 – Patient Education and Prevention of Complications or Future Respiratory Emergencies

C 10.10.7.1 – Discuss patient education and prevention of complications or future respiratory emergencies.

10.11 – HEMATOLOGY

10.11.1 – Introduction

C 10.11.1.1 – Discuss the incidence and morbidity/mortality of hematological emergencies.

C 10.11.1.2 – Describe the anatomy and physiology of the circulatory system as it relates to hematology.

10.11.2 – General Assessment Findings and Symptoms

C 10.11.2.1 – Discuss common general assessment findings and symptoms for hematological conditions or emergencies.

10.11.3 – General Management for a Patient with a Hematological Condition or Emergency

C 10.11.3.1 – Discuss the general prehosptial management of a patient with a hematological emergency or condition.

10.11.4 – Sickle Cell Disease

C 10.11.4.1. – Discuss the pathophysiology, mortality/morbidity, and management of a sickle cell crisis.

10.11.5 – Hematological Conditions

C 10.11.5.1 – Describe the pathophysiology, mortality/morbidity, complications, assessment findings and symptoms, and specific management considerations for various hematological conditions or emergencies.

10.11.6 – Blood Transfusion Complications

C 10.11.6.1 – List blood transfusion complications.

10.11.7 – Consider Age-Related Variations in Pediatric and Geriatric Patients

C 10.11.7.1 – Identify differences in hematological conditions or emergencies affecting pediatric and geriatric patients.

10.11.8 – Patient Education and Prevention

C 10.11.8.1 – Discuss patient education and prevention of complications or future hematological emergencies.

10.12 – GENITOURINARY/RENAL

10.12.1 – Introduction

C 10.12.1.1 – Describe the general anatomy and functions of the urinary system.

10.12.2 – Renal Diseases

C 10.12.2.1 – Discuss the pathophysiology, incidence, morbidity/mortality, assessment findings, symptoms, and management of renal disease emergencies.

10.12.3 – Urinary System Conditions

C 10.12.3.1 - Discuss the pathophysiology, incidence, assessment findings, symptoms, and management of urinary system emergencies.

10.12.4 – Male Genital Tract Conditions

C 10.12.4.1 – Discuss the pathophysiology, incidence, assessment findings, symptoms, and management of male genital tract conditions or emergencies.

10.12.5 – Consider Age-Related Variations for Pediatric and Geriatric Patients

C 10.12.5.1 – Identify differences in genitourinary/renal conditions or emergencies affecting pediatric and geriatric patients.

10.12.6 – Communication and Documentation

C 10.12.6.1 – Discuss communication and documentation considerations for patients with genitourinary/renal conditions or emergencies.

10.12.7 – Transport Decisions

C 10.12.7.1 – Discuss transport considerations for patients with genitourinary/renal conditions or emergencies.

10.12.8 – Patient Education and Prevention

C 10.12.8.1 – Discuss patient education and prevention of complications or future genitourinary/renal conditions or emergencies.

10.13 – GYNECOLOGY

10.13.1 – Introduction

C 10.13.1.1 – Describe the female reproductive system anatomy.

10.13.2 – Physiology

C 10.13.2.1 – Describe the female menstrual and ovarian cycles.

10.13.3 – Symptoms and Assessment Findings

C 10.13.3.1 – Discuss potential symptoms and assessment findings related to a gynecological examination.

10.13.4 – General Management

C 10.13.4.1 – Discuss the general management of a patient with a gynecological condition or emergency.

10.13.5 – Vaginal Bleeding

C 10.13.5.1 – Discuss the pathophysiology, assessment findings, and management of a female patient with vaginal bleeding.

10.13.6 – Sexual Assault

C 10.13.6.1 - Discuss the pathophysiology, assessment findings, and management of a female patient after a sexual assault.

10.13.7 – Infection (Including Pelvic Inflammatory Disease, Barthloin's Abscess, and Vaginitis/Vulvovaginitis)

C 10.13.7.1 – Discuss the pathophysiology, assessment findings, and management of a female patient with a gynecological infection.

10.13.8 – Ovarian Cyst and Ruptured Ovarian Cyst

C 10.13.8.1. – Discuss the pathophysiology, assessment findings, and management of a female patient with an ovarian cyst or ruptured ovarian cyst.

10.13.9 – Ovarian Torsion

C 10.13.9.1 – Discuss the pathophysiology, assessment findings, and management of a female patient with ovarian torsion.

10.13.10 – Endometriosis

C 10.13.10.1 – Discuss the pathophysiology, assessment findings, and management of a female patient with endometriosis.

10.13.11 – Dysfunctional Uterine Bleeding

C 10.13.11.1 – Discuss the pathophysiology, assessment findings, and management of a female patient with dysfunctional uterine bleeding.

10.13.12 – Prolapsed Uterus

C 10.13.12.1 - Discuss the pathophysiology, assessment findings, and management of a female patient with a prolapsed uterus.

10.13.13 – Vaginal Foreign Body

C 10.13.13.1 – Discuss the pathophysiology, assessment findings, and management of a female patient with a vaginal foreign body.

10.13.14 – Age-Related Variations

C 10.13.14.1 – Identify differences in gynecological conditions or emergencies affecting pediatric and geriatric patients.

10.13.15 – Communication and Documentation

C 10.13.15.1 – Discuss communication and documentation considerations for patients with gynecological conditions or emergencies.

10.13.16 – Transport Decisions

C 10.13.16.1 – Discuss transport considerations for patients with gynecological conditions or emergencies.

10.14 – NON-TRAUMATIC MUSCULOSKELETAL DISORDERS

10.14.1 – Introduction

C 10.14.1.1 – Discuss the incidence and morbidity/mortality of non-traumatic musculoskeletal disorders.

10.14.2 – General Assessment Findings and Symptoms

C 10.14.2. – Discuss general assessment findings and symptoms associated with non-traumatic musculoskeletal disorders.

10.14.3 – General Management for a Patient with a common or Major Non-Traumatic Musculoskeletal Disorder

C 10.14.3.1 – Discuss the general management of a patient with a non-traumatic musculoskeletal disorder or emergency.

10.14.4 – Non-Traumatic Musculoskeletal Conditions

C 10.14.4.1 – Discuss the pathophysiology, assessment findings, and management of common non-traumatic musculoskeletal conditions or emergencies.

10.14.5 – Consider Age-Related Variations in Pediatric and Geriatric Patients

C 10.14.5.1. – Identify differences in non-traumatic musculoskeletal conditions or emergencies affecting pediatric and geriatric patients.

10.14.6 – Patient Education and Prevention

C 10.14.6.1 – Discuss patient education and prevention of complications or future non-traumatic musculoskeletal conditions or emergencies.

10.15 – DISEASES OF THE EYES, EARS, NOSE, AND THROAT

10.15.1 – Introduction

C 10.15.1.1 – Discuss the incidence and morbidity/mortality of diseases affecting the eyes, ears, nose, and throat.

10.15.2 – General Assessment Findings and Symptoms

C 10.15.2.1 – Discuss general assessment findings and symptoms for diseases affecting the eyes, ears, nose, and throat.

10.15.3 – General Management

C 10.15.3.1. – Discuss the general prehospital management of patients with diseases affecting the eyes, ears, nose, and throat.

10.15.4 – Diseases of the Eyes, Ears, Nose, and Throat

C 10.15.4.1 – Discuss the pathophysiology, complications, assessment findings, and management of diseases affecting the eyes, ears, nose, and throat.

10.15.5 – Consider Age-Related Variations in Pediatric and Geriatric Patients

C 10.15.5.1 – Discuss differences in diseases affecting the eyes, ears, nose, and throat in pediatric patients.

10.15.6 – Patient Education and Prevention

C 10.15.6.1 – Discuss patient education and prevention of complications or future diseases of the eyes, ears, nose, or throat.

11.0 – SHOCK AND RESUSCITATION

11.1 – SHOCK AND RESUSCITATION

11.1.1 – Ethical Issues in Resuscitation

C 11.1.1.1 – Discuss ethical issues in resuscitation.

11.1.2 – Pre-Morbid Conditions

C 11.1.2.1 – Differentiate between the pre-morbid conditions of a healthy and unhealthy adult patient.

11.1.3 – Anatomy and Physiology Review

C 11.1.3.1 – Discuss the anatomy and physiology of the respiratory and cardiovascular systems.

11.1.4 – Physiology of Normal Blood Flow

C 11.1.4.1 – Describe the physiology of normal blood flow through the body.

11.1.5 – Physiology of Blood Flow During CPR

C 11.1.5.1 – Discuss the physiology of blood flow through the body during CPR, including heart pump theory, thoracic pump theory, and the impact of negative intrathoracic pressure.

11.1.6 – Cardiac Arrest

C 11.1.6.1 – Discuss the epidemiology and pathophysiology of cardiac arrest.

11.1.7 – Resuscitation

C 11.1.7.1 – List system components to maximize survival for a patient suffering from a cardiac arrest.
C 11.1.7.2 – Describe basic life support interventions (refer to current AHA guidelines).
C 11.1.7.3 – Describe airway control and ventilation interventions.
C 11.1.7.4 – Discuss the delivery of effective chest compressions.

11.1.8 – Automated External Defibrillation (Refer to Current AHA Guidelines)

C 11.1.8.1 – List the steps involved in administering automated external defibrillation to a patient suffering from a cardiac arrest (refer to current AHA guidelines).

11.1.9 – Advanced Life Support (Refer to Current AHA Guidelines)

C 11.1.9.1 – Describe ALS electrical therapies used in the treatment of cardiac arrest.
C 11.1.9.2 – Describe ALS intravenous access as pertinent to treating cardiac arrest.
C 11.1.9.3 – List arrest cardiac rhythms.
C 11.1.9.4 – List non-arrest cardiac rhythms.

11.1.10 – Special Arrest and Peri-Arrest Situations (Refer to Current AHA Guidelines)

C 11.1.10.1 – Discuss the epidemiology, pathophysiology, and management of patients with special arrest and peri-arrest situations (refer to current AHA guidelines).

11.1.11 – Postresuscitation Support (Refer to the Current AHA Guidelines)

C 11.1.11.1 – Discuss postresuscitation support after the return of spontaneous circulation ("ROSC"). (Refer to current AHA guidelines.)

11.1.12 – Shock

C 11.1.12.1 – Define shock.
C 11.1.12.2 – Discuss anatomy and physiology as related to shock.
C 11.1.12.3 – Discuss the essential components for normal perfusion.
C 11.1.12.4 – Discuss tissue hypoperfusion.
C 11.1.12.5 – Discuss the physiologic response to shock.
C 11.1.12.6 – Discuss the stages of shock.
C 11.1.12.7 – Discuss specific types of shocks.
C 11.1.12.8 – Discuss complications associated with shock.

C 11.1.12.9 – Discuss the assessment of a patient suffering from shock.
C 11.1.12.10 – Discuss the management of a patient suffering from shock.
C 11.1.12.11 – Identify devices to assist circulation in patients suffering from shock.
C 11.1.12.12 – Identify differences between pediatric and geriatric patients suffering from shock.

12.0 – TRAUMA

12.1 – TRAUMA OVERVIEW

12.1.1 – Identification and Categorization of Trauma Patients

C 12.1.1.1 – Discuss the identification and categorization of trauma patients as defined by the National Trauma Triage Protocol.

12.1.2 – Incidence/Significance of Trauma

C 12.1.2.1 – Discuss the mortality, morbidity, and significance of trauma in the United States.

12.1.3 – Trauma System

C 12.1.3.1 – Discuss the trauma system as it exists in Wisconsin.

12.1.4 – Types of Injury

C 12.1.4.1 – List different types of traumatic injuries.

12.1.5 – Trauma Assessment

C 12.1.5.1 – List the major components of the trauma patient assessment.
C 12.1.5.2 – Differentiate between significant and non-significant mechanisms of injury ("MOI").
C 12.1.5.3 – Describe the primary assessment of a trauma patient.
C 12.1.5.4 – Describe the secondary assessment (head-to-toe physical examination) of a trauma patient.
P 12.1.5.5 – Manage trauma care.

12.1.6 – Role of Documentation in Trauma

C 12.1.6.1 – Discuss the role of documentation in caring for victims of trauma.

12.1.7 – Trauma Scoring Scales

C 12.1.7.1 – Discuss trauma scoring scales.

12.1.8 – Trauma Center Designations

C 12.1.8.1 – Discuss trauma center designations.

12.1.9 – Transfer of Patients to the Most Appropriate Hospital

C 12.1.9.1 – Discuss the transfer of trauma patients to the most appropriate hospital.

12.2 – BLEEDING

12.2.1 – Incidence

C 12.2.1.1 – Discuss the mortality and morbidity affecting at-risk populations with traumatic bleeding.

12.2.2 – Anatomy and Function

C 12.2.2.1 – Discuss the anatomy and function of the respiratory, circulatory, and central nervous systems as they pertain to traumatic bleeding.

12.2.3 – Pathophysiology

C 12.2.3.1 – Discuss the pathophysiology of traumatic bleeding.
C 12.2.3.2 – Discuss organ involvement in shock due to traumatic bleeding.
C 12.2.3.3 – Discuss the classifications of shock as related to traumatic bleeding.
C 12.2.3.4 – Discuss compensatory shock as related to traumatic bleeding.
C 12.2.3.5 – Discuss decompensated shock as related to traumatic bleeding.
C 12.2.3.6 – Discuss the complications of shock as related to traumatic bleeding.

12.2.4 – Assessment Consideration in Shock

C 12.2.4.1 – Discuss assessment considerations for a patient in shock due to traumatic bleeding.

12.2.5 – Shock Management Strategies and Considerations

C 12.2.5.1 – Discuss shock management strategies and considerations for a patient with traumatic bleeding.

12.2.6 – Bleeding Considerations

C 12.2.6.1 – Discuss the pathophysiology, assessment findings, and management considerations for a patient with traumatic bleeding.

12.3 – CHEST TRAUMA

12.3.1 – Incidence of Chest Trauma

C 12.3.1.1 – Describe the morbidity and mortality of chest trauma, including prevention strategies.

12.3.2 – Traumatic Aortic Disruption

C 12.3.2.1 – Discuss the pathophysiology, assessment considerations, and management of a patient with a traumatic aortic disruption.

12.3.3 – Pulmonary Contusions

C 12.3.3.1 – Discuss the pathophysiology, assessment considerations, and management of a patient with a pulmonary contusion.

12.3.4 – Blunt Cardiac Injury

C 12.3.4.1 – Discuss the pathophysiology, assessment considerations, and management of a patient with a blunt cardiac injury.

12.3.5 – Hemothorax

C 12.3.5.1 – Discuss the pathophysiology, assessment considerations, and management of a patient with a hemothorax.

12.3.6 – Pneumothorax

C 12.3.6.1 – Discuss the pathophysiology, assessment considerations, and management of a patient with an open, simple, or tension pneumothorax.

12.3.7 – Cardiac Tamponade

C 12.3.7.1 – Discuss the pathophysiology, assessment considerations, and management of a patient with a cardiac tamponade.

12.3.8 – Rib Fractures

C 12.3.8.1 – Discuss the pathophysiology, assessment considerations, and management of a patient with rib fractures.

12.3.9 – Flail Chest

C 12.3.9.1 – Discuss the pathophysiology, assessment considerations, and management of a patient with a flail chest.

12.3.10 – Commotio Cordis

C 12.3.10.1 – Discuss the pathophysiology, assessment considerations, and management of a patient with commotio cordis.

12.3.11 – Tracheobronchial Disruption

C 12.3.11.1 – Discuss the pathophysiology, assessment considerations, and management of a patient with tracheobronchial disruption.

12.3.12 – Diaphragmatic Rupture

C 12.3.12.1 – Discuss the pathophysiology, assessment considerations, and management of a patient with a diaphragmatic rupture.

12.3.13 – Traumatic Asphyxia

C 12.3.13.1 – Discuss the pathophysiology, assessment considerations, and management of a patient with traumatic asphyxia.

12.3.14 – Pediatric Considerations in Chest Trauma

C 12.3.14.1 – Discuss pediatric considerations as they pertain to the management of non-adult patients with chest trauma.

12.3.15 – Geriatric Considerations in Chest Trauma

C 12.3.15.1 – Discuss geriatric considerations pertaining to the treatment of geriatric patients with chest trauma.

12.4 – ABDOMINAL AND GENITOURINARY TRAUMA

12.4.1 – Incidence

C 12.4.1.1 – Describe the morbidity and mortality of abdominal and genitourinary trauma, including prevention strategies.

12.4.2 – Vascular Injury

C 12.4.2.1 – Discuss the pathophysiology, assessment considerations, and management of a patient with vascular injury.

12.4.3 – Solid and Hollow Organ Injuries

C 12.4.3.1 – Discuss the pathophysiology, assessment considerations, and management of a patient with solid and/or hollow organ injuries.

12.4.4 – Blunt versus Penetrating Abdominal Injury

C 12.4.4.1 – Discuss the pathophysiology, assessment considerations, and management of a patient with a blunt or penetrating injury.

12.4.5 – Evisceration

C 12.4.5.1 – Discuss the pathophysiology, assessment considerations, and management of a patient with an evisceration.

12.4.6 – Retroperitoneal Injury

C 12.4.6.1 – Discuss the pathophysiology, assessment considerations, and management of a patient with a retroperitoneal injury.

12.4.7 – Injuries to External Genitalia

C 12.4.7.1 – Discuss the pathophysiology, assessment considerations, and management of a patient with an injury to the external genitalia.

12.4.8 – Age-Related Variations

C 12.4.8.1 – Identify differences between pediatric and geriatric patients suffering from abdominal and genitourinary trauma.

12.5 – ORTHOPEDIC TRAUMA

12.5.1 – Incidence

C 12.5.1.1 – Describe the morbidity and mortality of orthopedic trauma, including prevention strategies.

12.5.2 – Pediatric Fractures

C 12.5.2.1 – Discuss the pathophysiology, assessment considerations, and management of pediatric fractures.

12.5.3 – Tendon Lacerations / Transection / Rupture (Achilles and Patellar)

C 12.5.3.1 – Discuss the pathophysiology, assessment considerations, and management of tendon lacerations, transections or ruptures (Achilles and patellar).

12.5.4 – Open Fractures

C 12.5.4.1 – Discuss the pathophysiology, assessment considerations, and management of open fractures.

12.5.5 – Closed Fractures

C 12.5.5.1 – Discuss the pathophysiology, assessment considerations, and management of closed fractures.

12.5.6 – Dislocations

C 12.5.6.1 – Discuss the pathophysiology, assessment considerations, and management of dislocations.

12.5.7 – Compartment Syndrome

C 12.5.7.1 – Discuss the pathophysiology, assessment considerations, and management of compartment syndrome.

12.6 – SOFT TISSUE TRAUMA

12.6.1 – Incidence of Soft Tissue Injury

C 12.6.1.1 – Describe the morbidity and mortality of soft tissue trauma.

12.6.2 – Anatomy and Physiology of Soft Tissue Injury

C 12.6.2.1 – Discuss the anatomy and physiology of soft tissue injury.

12.6.3 – Pathophysiology of Wound Healing

C 12.6.3.1 – Discuss the pathophysiology of wound healing.

12.6.4 – Wounds

C 12.6.4.1 - Discuss the pathophysiology, assessment considerations, and management of avulsions.
C 12.6.4.2 – Discuss the pathophysiology, assessment considerations, and management of bite wounds.
C 12.6.4.3 – Discuss the pathophysiology, assessment considerations, and management of lacerations.
C 12.6.4.4 – Discuss the pathophysiology, assessment considerations, and management of puncture words.

12.6.5 – Burns

C 12.6.5.1 – Discuss the pathophysiology, assessment considerations, and management of electrical burns.
C 12.6.5.2 – Discuss the pathophysiology, assessment considerations, and management of chemical burns.
C 12.6.5.3 – Discuss the pathophysiology, assessment considerations, and management of thermal burns.

12.6.6 – High-Pressure Injection Wounds

C 12.6.6.1 – Discuss the pathophysiology, assessment considerations, and management of high-pressure injection wounds.

12.7 – HEAD, FACE, NECK, AND SPINE TRAUMA

12.7.1 – Introduction

C 12.7.1.1 – Discuss the incidence of head, facial, neck, and spinal trauma.
C 12.7.1.2 – Identify mechanisms of head, facial, neck, and spinal trauma.
C 12.7.1.3 – Discuss the morbidity and mortality of head, facial, neck, and spinal trauma.
C 12.7.1.4 – Identify categories of injury for head, facial, neck, and spinal trauma.
C 12.7.1.5 – Discuss causes of brain injury.
C 12.7.1.6 – Identify injuries also associated with head, facial, neck, and spinal trauma.
C 12.7.1.7 – Discuss the prevention of head, facial, neck, and spinal trauma.

12.7.2 – Unstable Facial Fractures

C 12.7.2.1 – Discuss the pathophysiology, assessment considerations, and management of unstable facial fractures.

12.7.3 – Orbital Fractures

C 12.7.3.1 – Discuss the pathophysiology, assessment considerations, and management of orbital fractures.

12.7.4 – Perforated Tympanic Membrane

C 12.7.4.1 – Discuss the pathophysiology, assessment considerations, and management of a perforated tympanic membrane.

12.7.5 – Skull Fractures

C 12.7.5.1 – Discuss the pathophysiology, assessment considerations, and management of skull fractures.

12.7.6 – Penetrating Neck Trauma (Non-Cord Involvement)

C 12.7.6.1 – Discuss the pathophysiology, assessment considerations, and management of penetrating neck trauma (no spinal cord involvement).

12.7.7 – Laryngeotracheal Injuries

C 12.7.7.1 – Discuss the pathophysiology, assessment considerations, and management of laryngeotracheal injuries.

12.7.8 – Spine Trauma (Non-CNS Involvement)

C 12.7.8.1 – Discuss the pathophysiology, assessment considerations, and management of spinal trauma (no central nervous system involvement).

12.7.9 – Mandibular Fractures

C 12.7.9.1 – Discuss the pathophysiology, assessment considerations, and management of mandibular fractures.

12.8 – NERVOUS SYSTEM TRAUMA

12.8.1 – Incidence

C 12.8.1.1 – Describe the morbidity and mortality of nervous system trauma, including prevention strategies.

12.8.2 – Cauda Equine Syndrome

C 12.8.2.1 – Discuss the pathophysiology, assessment considerations, and management of cauda equine syndrome.

12.8.3 – Nerve Root Injury

C 12.8.3.1 – Discuss the pathophysiology, assessment considerations, and management of nerve root injury.

12.8.4 – Peripheral Nerve Injury

C 12.8.4.1 – Discuss the pathophysiology, assessment considerations, and management of a peripheral nerve injury.

12.8.5 – Traumatic Brain Injury

C 12.8.5.1 – Discuss the pathophysiology, assessment considerations, and management of traumatic brain injuries.

12.8.6 – Spinal Cord Injury

C 12.8.6.1 – Discuss the pathophysiology, assessment considerations, and management of spinal cord injuries.

12.8.7 – Spinal Shock

C 12.8.7.1 – Discuss the pathophysiology, assessment considerations, and management of spinal shock.

12.9 – SPECIAL CONSIDERATIONS IN TRAUMA

12.9.1 – Trauma in Pregnancy

C 12.9.1.1 – Discuss the incidence, pathophysiology, assessment considerations, and management of traumatic injury given a pregnant patient.

12.9.2 – Pediatric Trauma

C 12.9.2.1 – Discuss the unique aspects, pathophysiology, assessment considerations, and management of traumatic injuries in pediatric patients.

12.9.3 – Geriatric Trauma

C 12.9.3.1 – Discuss the unique aspects, pathophysiology, assessment considerations, and management of traumatic injuries in geriatric patients.

12.9.4 – Cognitively Impaired Patient

C 12.9.4.1 – Discuss the unique challenges, assessment considerations, and management of traumatic injuries in cognitively impaired patients.

12.10 – ENVIRONMENTAL EMERGENCIES

12.10.1 – Incidence

C 12.10.1.1 – Describe the morbidity, mortality, and risk factors of environmental emergencies, including prevention strategies

12.10.2 – Submersion Incidents

C 12.10.2.1 – Discuss the pathophysiology, assessment considerations, and management of submersion incidents.

12.10.3 – Temperature-Related Illness

C 12.10.3.1 – Discuss the pathophysiology, assessment considerations, and management of temperature-related incidents.

12.10.4 – Bites and Envenomations

C 12.10.4.1 – Discuss the pathophysiology, assessment considerations, and management of bites and envenomations.

12.10.5 – Electrical Injury (Lightning Strikes)

C 12.10.5.1 – Discuss the pathophysiology, assessment considerations, and management of electrical injury from lightning strikes.

12.10.6 – High Altitude Illness

C 12.10.6.1 – Discuss the pathophysiology, assessment considerations, and management of high altitude illness.

12.11 – MULTI-SYSTEM TRAUMA

12.11.1 – Kinematics of Trauma

C 12.11.1.1 – Discuss the kinematics of trauma.

12.11.2 – Multi-System Trauma

C 12.11.2.1 – Define multi-system trauma.
C 12.11.2.2 – Discuss the golden principles of out-of-hospital trauma care.
C 12.11.2.3 – Discuss critical thinking in multi-system trauma care.

12.11.3 – Specific Injuries Related to Multi-System Trauma

C 12.11.3.1 – Discuss the pathophysiology, signs/symptoms, and management of multi-system trauma resulting from blast injuries.

13.0 – SPECIAL PATIENT POPULATIONS

13.1 – OBSTETRICS

C 13.1.1.1 – Discuss the female reproductive system and reproductive cycle.

13.1.2 – Physiology

C 13.1.2.1 – Discuss the physiology of pregnancy.

13.1.3 – General System Physiology, Assessment, and Management of the Obstetrical Patient

C 13.1.3.1 – Discuss the signs, stages, assessment, and management of labor and delivery.

13.1.4 – Complications Related to Pregnancy

C 13.1.4.1 – Discuss pathophysiology, assessment, and management of complications related to pregnancy.

13.1.5 – High Risk Pregnancy: Pathophysiology, Assessment, Complications, and Management

C 13.1.5.1 – Discuss the pathophysiology, assessment, complications, and management of high-risk pregnancies.

13.1.6 – Complications of Labor: Pathophysiology, Assessment, Complications, and Management

C 13.1.6.1 – Discuss the pathophysiology, assessment, complications, and management of complicated labor.

13.1.7 – Complications of Delivery: Pathophysiology, Assessment, Complications, and Management

C 13.1.7.1 – Discuss the pathophysiology, assessment, complications, and management of complicated deliveries.

13.2 – NEONATAL CARE

13.2.1 – Introduction

C 13.2.1.1 – Define newborn and neonate.

13.2.2 – General Pathophysiology, Assessment, and Management

C 13.2.2.1 – Discuss the epidemiology, pathophysiology, assessment, and management of newborns/neonates.

13.2.3 – Specific Situations

C 13.2.3.1 – Discuss the epidemiology, pathophysiology, assessment, and management of specific newborn/neonatal conditions or emergencies.

13.3 – PEDIATRICS

13.3.1 – Pediatric Anatomical Variations and Assessment

C 13.3.1.1 – Differentiate the anatomical differences between the pediatric and adult head.
C 13.3.1.2 – Differentiate the anatomical differences between the pediatric and adult airway.
C 13.3.1.3 – Differentiate the anatomical differences between the pediatric and adult chest and lungs.
C 13.3.1.4 – Differentiate the anatomical differences between the pediatric and adult abdomen.
C 13.3.1.5 – Differentiate the anatomical differences between the pediatric and adult extremities.
C 13.3.1.6 – Differentiate the anatomical differences between the pediatric and adult skin and body surface area.
C 13.3.1.7 – Differentiate the anatomical differences between the pediatric and adult respiratory system.

C 13.3.1.8 – Differentiate the anatomical differences between the pediatric and adult nervous system and spinal column.
C 13.3.1.9 – Differentiate the metabolic differences between a pediatric and adult patient.

13.3.2 – Growth and Development
C 13.3.2.1 – Discuss the physical, cognitive, and emotional development of infants.
C 13.3.2.2 – Discuss the physical, cognitive, and emotional development of toddlers.
C 13.3.2.3 – Discuss the physical, cognitive, and emotional development of preschoolers.
C 13.3.2.4 – Discuss the physical, cognitive, and emotional development during middle childhood.
C 13.3.2.5 – Discuss the physical, cognitive, and emotional development of adolescents.

13.3.3 – Pediatrics: Specific Pathophysiology, Assessment, and Management
C 13.3.3.1 – Discuss the pathophysiology, assessment, and management of specific pediatric medical conditions or emergencies.

13.3.4 – Abuse and Neglect
C 13.3.4.1 – Discuss the assessment and management of a pediatric abuse and neglect patient.

13.3.5 – Sudden Infant Death Syndrome
C 13.3.5.1 – Discuss the risk factors, assessment, and management of a sudden infant death syndrome casualty.

13.4 – GERIATRICS

13.4.1 – Normal and Abnormal Changes Associated with Aging
C 13.4.1.1 – Discuss normal and abnormal changes associated with aging.

13.4.2 – Sensory Changes
C 13.4.2.1 – Discuss sensory changes in vision, hearing, and pain perception related to aging.

13.4.3 – Pharmacokinetic Change
C 13.4.3.1 – Discuss physiological changes of aging that impact pharmokinetics.

13.4.4 – Polypharmacy
C 13.4.4.1 – Discuss polypharmacy as related to aging.

13.4.5 – Psychosocial and Economic Aspects
C 13.4.5.1 – Discuss the psychosocial and economic aspects of aging in the United States.

13.4.6 – Specific Conditions that Occur More Frequently in the Elderly
C 13.4.6.1 – Discuss the pathophysiology and management of specific medical conditions or emergencies that occur more frequently in the elderly.

13.5 – PATIENTS WITH SPECIAL CHALLENGES

13.5.1 – Abuse and Neglect
C 13.5.1.1 – Discuss the epidemiology, history, assessment considerations, management, legal aspects, risk profiles, and documentation requirements applicable to abuse and neglect patients.

13.5.2 – Homelessness/Poverty
C 13.5.2.1 – Describe the challenges associated with, resources available for, and special considerations in the treatment of homeless or poverty-stricken patients.

13.5.3 – Bariatric Patients
C 13.5.3.1 – Discuss the risk factors, special considerations, and patient-handling issues associated with bariatric patients.

13.5.4 – Technology Assisted/Dependent
C 13.5.4.1 – Describe care considerations for the technology assisted/dependent patient.

13.5.5 – Hospice Care and Terminally Ill
C 13.5.5.1 – Describe hospice care and terminally ill care considerations.

13.5.6 – Tracheostomy Care/Dysfunction
C 13.5.6.1 – Describe the care considerations for a patient with a tracheostomy.

13.5.7 – Technology Assisted Patients
C 13.5.7.1 – Discuss the assessment and management of patients who require adaptive/assistive technology devices.

13.5.8 – Pediatric Developmental Disabilities
C 13.5.8.1 – Describe the causes, signs, and special considerations in management of pediatric patients with developmental disabilities.

13.5.9 – Emotionally Impaired
C 13.5.9.1 – Describe the causes and special considerations in management of emotionally impaired patients.

13.5.10 – Physical Needs/Challenges

C 13.5.10.1 – Discuss special considerations in managing patients with specific physical needs or challenges (hearing, visual, speech, or paraplegia/quadriplegia).

13.5.11 – Patients with Communicable Diseases

C 13.5.11.1 – Discuss special considerations in providing care to patients with communicable diseases.

13.5.12 – Terminally Ill Patients

C 13.5.12.1 – Discuss special considerations in providing care to terminally ill patients.

13.5.13 – Mental Needs/Challenges

C 13.5.13.1 – Discuss special considerations in providing care to patients with psychiatric disorders.

13.5.14 – Specific Challenges Created by Chronic Conditions

C 13.5.14.1 – Discuss the specific challenges and considerations associated with chronic conditions.

14.0 – EMS OPERATIONS

14.1 – PRINCIPLES OF SAFELY OPERATING A GROUND AMBULANCE

14.2 – INCIDENT MANAGEMENT

14.2.1 – National Incident Management System ("NIMS")

C 14.2.1.1 – Complete FEMA IS-700 and IS-100 training.

P 14.2.1.2 – Apply National Incident Management System ("NIMS") standards.

14.3 – MULTIPLE CASUALTY INCIDENTS

14.3.1 – Triage Systems

P 14.3.1.1 – Utilize a triage system for mitigating multiple casualty incidents.

14.4 – AIR MEDICAL

14.4.1 – Medical Risks/Needs/Advantages

C 14.4.1.1 – Describe the medical risks, needs, and advantages to utilizing air medical services.

14.5 – VEHICLE EXTRICATION

14.5.1 – Safe Vehicle Extrication

C 14.5.1.1 – Discuss safety considerations integral to vehicle extrication operations.

14.5.2 – Use of Simple Hand Tools

C 14.5.2.1 – Identify simple hand tools that can be used for vehicle extrication.

14.5.3 – Special Considerations for Patient Care

C 14.5.3.1 – Discuss special considerations for care of a patient requiring extrication from a vehicle.

14.6 – HAZARDOUS MATERIALS AWARENESS

14.6.1 – Hazardous Materials Awareness

C 14.6.1.1 – Complete hazardous materials awareness/cold zone operations (HAZWOPER) training.

C 14.6.1.2 – Comply with Wisconsin weapons of mass destruction ("WMD") training requirements.

P 14.6.1.3 – Prepare for the treatment of patients exposed to hazardous materials.

14.7 – MASS CASUALTY INCIDENTS DUE TO TERRORISM AND DISASTER

14.7.1 – Risks and Responsibilities of Operating on the Scene of a Natural or Man-Made Disaster

C 14.7.1.1 – Discuss the role of EMS and safety considerations while operating on the scene of a natural or man-made disaster.

2011 Wisconsin Paramedic Curriculum

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