Wisconsin Standardized Paramedic Curriculum

September 2011
Wisconsin Department of Health Services, EMS Section
# 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)

Committee Members (Alphabetical)
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):

<table>
<thead>
<tr>
<th>Topic</th>
<th>Didactic</th>
<th>Laboratory</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.0 – Preparatory</td>
<td>28</td>
<td>0</td>
<td>28</td>
</tr>
<tr>
<td>6.0 – Public Health</td>
<td>2</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>3.0 – Medical Terminology</td>
<td>6</td>
<td>0</td>
<td>6</td>
</tr>
<tr>
<td>2.0 – Anatomy and Physiology</td>
<td>14</td>
<td>0</td>
<td>14</td>
</tr>
<tr>
<td>4.0 – Pathophysiology</td>
<td>46</td>
<td>0</td>
<td>46</td>
</tr>
<tr>
<td>11.1.12 - Shock</td>
<td>6</td>
<td>0</td>
<td>6</td>
</tr>
<tr>
<td>Section Description</td>
<td>Hours</td>
<td>Contact Hours</td>
<td>Total Hours</td>
</tr>
<tr>
<td>-------------------------------------------------------------------------------------</td>
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<td>---------------</td>
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<tr>
<td>10.4 – Immunology</td>
<td>3</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>12.2 - Bleeding</td>
<td>3</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>5.0 – Life Span Development</td>
<td>4</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>9.0 – Patient Assessment</td>
<td>20</td>
<td>30</td>
<td>50</td>
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<td>10.1 – Medical Overview</td>
<td>4</td>
<td>6</td>
<td>10</td>
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<td>13.3.1 – Pediatric Anatomical Variations and Assessment</td>
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<td>2</td>
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<td>13.3.2 – [Pediatric] Growth and Development</td>
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<td>2</td>
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<td>13.4.1 – Normal and Abnormal Changes Associated with Aging</td>
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<td>0</td>
<td>2</td>
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<tr>
<td>13.4.2 – Sensory Changes [Associated with Aging]</td>
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<td>2</td>
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<tr>
<td>7.0 – Pharmacology</td>
<td>32</td>
<td>36</td>
<td>68</td>
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<td>13.4.3 – Pharmacokinetic Changes [Associated with Aging]</td>
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<td>2</td>
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<tr>
<td>13.4.4 – Polypharmacy [Associated with Aging]</td>
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<td>0</td>
<td>2</td>
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<tr>
<td>8.0 – Airway Management, Respiration, and Artificial Ventilation</td>
<td>6</td>
<td>36</td>
<td>42</td>
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<tr>
<td>10.10 - Respiratory</td>
<td>12</td>
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<td>12</td>
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<td>10.8 - Cardiovascular</td>
<td>54</td>
<td>36</td>
<td>90</td>
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<tr>
<td>11.0 – Shock and Resuscitation (exclude 11.1.12)</td>
<td>0</td>
<td>36</td>
<td>36</td>
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<td>10.0 – Medicine (exclude 10.1, 10.4, 10.8, 10.10, and 10.13)</td>
<td>72</td>
<td>0</td>
<td>72</td>
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<tr>
<td>12.0 – Trauma (exclude 12.2 and 12.9)</td>
<td>36</td>
<td>36</td>
<td>72</td>
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<td>10.13 - Gynecology</td>
<td>12</td>
<td>12</td>
<td>24</td>
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<td>13.0 – Special Patient Populations</td>
<td>12</td>
<td>12</td>
<td>24</td>
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<td>12.9 – Special Considerations In Trauma</td>
<td>12</td>
<td>12</td>
<td>24</td>
</tr>
<tr>
<td>14.0 – EMS Operations</td>
<td>18</td>
<td>0</td>
<td>18</td>
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<tr>
<td>Capstone / NREMT Preparation</td>
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<td>36</td>
<td>36</td>
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<td><strong>Total</strong></td>
<td><strong>414</strong></td>
<td><strong>288</strong></td>
<td><strong>702</strong></td>
</tr>
</tbody>
</table>

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.

<table>
<thead>
<tr>
<th>Competency</th>
<th>Paramedic</th>
<th>I-to-P Transition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Venous Access</td>
<td></td>
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<tr>
<td>The student must demonstrate the ability to gain venous access using the following routes:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intravenous</td>
<td>20 Clinical / Field / HPS</td>
<td>10 Clinical / Field / HPS</td>
</tr>
<tr>
<td>Intraosseous</td>
<td>3 Simulated</td>
<td>3 Simulated</td>
</tr>
<tr>
<td>Medication Administration</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The student must demonstrate the ability to safely perform all the steps of each procedure and properly administer medications using the following routes:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IV-Bolus</td>
<td>10 Clinical / Field / HPS</td>
<td>5 Clinical / Field / HPS</td>
</tr>
<tr>
<td>IM</td>
<td>1 Simulated</td>
<td>1 Simulated</td>
</tr>
<tr>
<td>Competency</td>
<td>Paramedic</td>
<td>I-to-P Transition</td>
</tr>
<tr>
<td>----------------------------------------</td>
<td>-----------</td>
<td>-------------------</td>
</tr>
<tr>
<td>Sub-Q</td>
<td>1 Simulated</td>
<td>1 Simulated</td>
</tr>
<tr>
<td>IM or Sub-Q</td>
<td>2 Clinical / Field / HPS</td>
<td>2 Clinical / Field / HPS</td>
</tr>
<tr>
<td>Intranasal</td>
<td>2 Simulated</td>
<td>2 Simulated</td>
</tr>
<tr>
<td>Nebulized Breathing Treatment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Includes: hand-held, face mask, and in-line</td>
<td>1 Simulated</td>
<td>1 Simulated</td>
</tr>
<tr>
<td></td>
<td>2 Clinical / Field / HPS</td>
<td>2 Clinical / Field / HPS</td>
</tr>
</tbody>
</table>

**Airway Management**

The student must demonstrate the ability to safely perform each of the following airway management procedures:

<table>
<thead>
<tr>
<th>Affirmative Airway Management</th>
<th>8 Clinical / Field / HPS</th>
<th>4 Clinical / Field / HPS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Endotracheal Intubation</td>
<td>7 Simulated (includes challenging intubations)</td>
<td>7 Simulated (includes challenging intubations)</td>
</tr>
<tr>
<td></td>
<td>2 Clinical / Field (No HPS)</td>
<td>2 Clinical / Field (No HPS)</td>
</tr>
</tbody>
</table>

**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):

<table>
<thead>
<tr>
<th>Cardiac</th>
<th>10 Clinical / Field / HPS</th>
<th>10 Clinical / Field / HPS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Respiratory</td>
<td>10 Clinical / Field / HPS</td>
<td>10 Clinical / Field / HPS</td>
</tr>
<tr>
<td>Neurological / ALOC</td>
<td>10 Clinical / Field / HPS</td>
<td>10 Clinical / Field / HPS</td>
</tr>
<tr>
<td>Abdominal / GI / GU</td>
<td>10 Clinical / Field / HPS</td>
<td>10 Clinical / Field / HPS</td>
</tr>
<tr>
<td>Trauma</td>
<td>10 Clinical / Field / HPS</td>
<td>10 Clinical / Field / HPS</td>
</tr>
<tr>
<td>Diabetic</td>
<td>4 Clinical / Field / HPS</td>
<td>4 Clinical / Field / HPS</td>
</tr>
<tr>
<td>Obstetric</td>
<td>4 Simulated</td>
<td>4 Simulated</td>
</tr>
<tr>
<td>Psychiatric</td>
<td>4 Simulated</td>
<td>4 Simulated</td>
</tr>
</tbody>
</table>

**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:

<table>
<thead>
<tr>
<th>Pediatric</th>
<th>14 Clinical / Field / HPS</th>
<th>10 Clinical / Field / HPS</th>
</tr>
</thead>
<tbody>
<tr>
<td>17 years old or younger, from above list</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Field Experiences**

The student must participate in various roles during actual paramedic-level ambulance service provider responses.

<table>
<thead>
<tr>
<th>Observation</th>
<th>10 Field / HPS</th>
<th>0</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Team Member</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Team Member experiences over the minimum required may count toward &quot;Observation&quot; requirements.</td>
<td>20 Field / HPS</td>
<td>10 Field / HPS</td>
</tr>
<tr>
<td><strong>Team Leader</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Team Leader experiences over the minimum required number may count toward &quot;Team Member&quot; or &quot;Observation&quot; requirements.</td>
<td>20 Field / HPS</td>
<td>20 Field / HPS</td>
</tr>
</tbody>
</table>
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 complaint 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
- Clopidogrel (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
  o Pralidoxime (2-Pam Chloride)
  o Atropine
• Mark V kit
  o Pralidoxime (2-Pam Chloride)
  o Atropine
  o Diazepam (Valium)
• Methylprednisolone (Solu-Medrol)
• Metoclopramide (Reglan)
• Metoprolol (Lopressor)
• Midazolam (Versed)
• Morphine
• Nalbuphine (Nubian)
• Naloxone (Narcan)
• Nitroglycerin
  o Paste
  o Spray
  o Tablets
  o 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

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

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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 launches 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
<table>
<thead>
<tr>
<th>1.1.2 – EMS Systems</th>
<th>C 1.1.2.1 – Identify the components of an EMS system.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Manpower (levels of EMS licensure)</td>
</tr>
<tr>
<td>2.</td>
<td>Education and training (National EMS Education Agenda for the Future: A Systems Approach)</td>
</tr>
<tr>
<td>a.</td>
<td>National EMS Scope of Practice Model</td>
</tr>
<tr>
<td>b.</td>
<td>National EMS Education Standards</td>
</tr>
<tr>
<td>c.</td>
<td>National EMS Education Program Accreditation</td>
</tr>
<tr>
<td>d.</td>
<td>National EMS Certification</td>
</tr>
<tr>
<td>3.</td>
<td>Communications</td>
</tr>
</tbody>
</table>

- 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
<table>
<thead>
<tr>
<th>1.0 – Preparatory</th>
<th>2011 WI Paramedic Curriculum</th>
</tr>
</thead>
<tbody>
<tr>
<td>4. Transportation</td>
<td></td>
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<tr>
<td>5. Facilities</td>
<td></td>
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<tr>
<td>6. Critical care units</td>
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<tr>
<td>7. Use of public safety agencies</td>
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<tr>
<td>8. Consumer participation</td>
<td></td>
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<tr>
<td>9. Accessibility of care</td>
<td></td>
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<tr>
<td>10. Transfer of patients (integration with other professionals and continuity of care)</td>
<td></td>
</tr>
<tr>
<td>a. Medical personnel</td>
<td></td>
</tr>
<tr>
<td>b. Law enforcement</td>
<td></td>
</tr>
<tr>
<td>c. Emergency management</td>
<td></td>
</tr>
<tr>
<td>d. Home healthcare providers</td>
<td></td>
</tr>
<tr>
<td>e. Other responders</td>
<td></td>
</tr>
<tr>
<td>11. Standardized medical record-keeping</td>
<td></td>
</tr>
<tr>
<td>12. Patients’ information and education</td>
<td></td>
</tr>
<tr>
<td>a. Patient education</td>
<td></td>
</tr>
<tr>
<td>i. Pre-incident</td>
<td></td>
</tr>
<tr>
<td>ii. Post-incident</td>
<td></td>
</tr>
<tr>
<td>b. Public education</td>
<td></td>
</tr>
<tr>
<td>i. Role modeling</td>
<td></td>
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<tr>
<td>ii. Community involvement</td>
<td></td>
</tr>
<tr>
<td>iii. Leader activities</td>
<td></td>
</tr>
<tr>
<td>iv. Community activities</td>
<td></td>
</tr>
<tr>
<td>v. Prevention activities</td>
<td></td>
</tr>
<tr>
<td>13. Independent review and evaluation</td>
<td></td>
</tr>
<tr>
<td>14. Disaster linkage</td>
<td></td>
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<tr>
<td>15. Mutual aid agreements</td>
<td></td>
</tr>
</tbody>
</table>

### 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
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1.1.3 – Roles / Responsibilities / Professionalism of EMS Personnel

<table>
<thead>
<tr>
<th>C 1.1.3.1 – Describe the roles and responsibilities (attributes) of a paramedic as a health care professional.</th>
<th>N/A</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>C 1.1.3.2 – Describe the leadership/affective characteristics of a paramedic.</th>
<th>1. Attributes of professional</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Integrity</td>
<td>b. Empathy</td>
</tr>
<tr>
<td>c. Self-motivation</td>
<td>d. Appearance and personal hygiene</td>
</tr>
<tr>
<td>2. Confidence in skills and ability</td>
<td>3. Communication</td>
</tr>
<tr>
<td>a. Verbal</td>
<td>b. Written</td>
</tr>
<tr>
<td>4. Time management</td>
<td>5. Teamwork and diplomacy</td>
</tr>
<tr>
<td>6. Respect for patients, co-workers, and other healthcare professionals</td>
<td>7. Patient advocacy</td>
</tr>
<tr>
<td>8. Careful delivery of service</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>C 1.1.3.3 – Describe the administrative duties performed by a paramedic.</th>
<th>1. Record keeping and reporting</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. Special project and coordination and implementation</td>
<td>3. Station duties</td>
</tr>
<tr>
<td>4. Interagency relationships/partnerships</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>C 1.1.3.4 – Describe the mechanisms by which paramedics are credentialed as health care professionals.</th>
<th>1. Licensure</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. Certification</td>
<td>3. National registration</td>
</tr>
<tr>
<td>4. Reciprocity</td>
<td>5. Maintenance of certification and licensure</td>
</tr>
<tr>
<td>a. Personal responsibility</td>
<td>b. Continuing education</td>
</tr>
<tr>
<td>c. Skill competency verification</td>
<td>d. Criminal implications</td>
</tr>
<tr>
<td>e. Fees</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>C 1.1.3.5 – List less traditional roles filled by paramedics.</th>
<th>1. Expanded scope of practice</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. Paramedics in other settings</td>
<td></td>
</tr>
<tr>
<td>a. Emergency departments</td>
<td>b. Clinics</td>
</tr>
<tr>
<td>c. Health departments</td>
<td>d. Physicians office</td>
</tr>
<tr>
<td>e. Interfacility transport</td>
<td>f. Critical care transport</td>
</tr>
</tbody>
</table>

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
### C 1.1.3.6 – List the operational responsibilities of paramedics.

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>1.</td>
<td>Preparation</td>
</tr>
<tr>
<td>2.</td>
<td>Response</td>
</tr>
<tr>
<td>3.</td>
<td>Scene assessment</td>
</tr>
<tr>
<td>4.</td>
<td>Patient assessment</td>
</tr>
</tbody>
</table>
| 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.

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
</table>
| 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.

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>1.</td>
<td>Profession</td>
</tr>
<tr>
<td>2.</td>
<td>Specialized body of knowledge or expertise</td>
</tr>
</tbody>
</table>
1.0 – Preparatory

<table>
<thead>
<tr>
<th>1.1.3.9 – List affective characteristics of paramedics.</th>
<th>1. Integrity</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2. Empathy</td>
</tr>
<tr>
<td></td>
<td>3. Self-motivation</td>
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<tr>
<td></td>
<td>4. Appearance and hygiene</td>
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<tr>
<td></td>
<td>5. Self-confidence</td>
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<td></td>
<td>6. Time management</td>
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<td>7. Communication</td>
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<td>8. Teamwork and diplomacy</td>
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<tr>
<td></td>
<td>10. Patient advocacy</td>
</tr>
<tr>
<td></td>
<td>11. Careful delivery of service</td>
</tr>
</tbody>
</table>

| 1.1.3.10 – Plan for emergencies and the delivery of paramedic services. | N/A |

<table>
<thead>
<tr>
<th>P 1.1.3.11 – Maintain EMS vehicles and equipment.</th>
<th>N/A</th>
</tr>
</thead>
<tbody>
<tr>
<td>A 1.1.3.12 – Apply integrity to the position.</td>
<td>N/A</td>
</tr>
<tr>
<td>A 1.1.3.13 – Demonstrate empathy with patients.</td>
<td>N/A</td>
</tr>
<tr>
<td>A 1.1.3.14 – Assume responsibility for motivation of self and others.</td>
<td>N/A</td>
</tr>
<tr>
<td>A 1.1.3.15 – Maintain professional appearance and personal hygiene.</td>
<td>N/A</td>
</tr>
<tr>
<td>A 1.1.3.16 – Demonstrate self-confidence.</td>
<td>N/A</td>
</tr>
<tr>
<td>A 1.1.3.17 – Manage time effectively.</td>
<td>N/A</td>
</tr>
</tbody>
</table>

1.1 – EMS Systems
<table>
<thead>
<tr>
<th>A 1.1.3.18 – Demonstrate career development skills</th>
<th>N/A</th>
</tr>
</thead>
<tbody>
<tr>
<td>A 1.1.3.19 – Demonstrate leadership.</td>
<td>N/A</td>
</tr>
<tr>
<td>A 1.1.3.20 – Work effectively in a team (with diplomacy).</td>
<td>N/A</td>
</tr>
<tr>
<td>A 1.1.3.21 – Exhibit respect in diverse settings.</td>
<td>N/A</td>
</tr>
<tr>
<td>A 1.1.3.22 – Serve as a patient advocate.</td>
<td>N/A</td>
</tr>
<tr>
<td>A 1.1.3.23 – Deliver careful service.</td>
<td>N/A</td>
</tr>
</tbody>
</table>

### 1.1.4 – Quality Improvement

<table>
<thead>
<tr>
<th>C 1.1.4.1 – Define quality improvement in the EMS environment</th>
<th>System for continually evaluating and improving care</th>
</tr>
</thead>
<tbody>
<tr>
<td>C 1.1.4.2 – Describe the contribution of continuous quality improvement (CQI) to EMS.</td>
<td>Dynamic process</td>
</tr>
</tbody>
</table>

### 1.1.5 – Patient Safety

<table>
<thead>
<tr>
<th>C 1.1.5.1 – Recognize significance of patient safety to EMS.</th>
<th>One of the most urgent health care challenges</th>
</tr>
</thead>
<tbody>
<tr>
<td>C 1.1.5.2 – Discuss incidence of medical errors.</td>
<td>IoM report “To Err is Human” up to 98,000 patients die due to medical errors</td>
</tr>
</tbody>
</table>
| 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

<table>
<thead>
<tr>
<th>Objective</th>
<th>Educational Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.2.1 – Research Principles to Interpret Literature and Advocate Evidence-Based Practice</td>
<td></td>
</tr>
</tbody>
</table>
| **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

<table>
<thead>
<tr>
<th>Objective</th>
<th>Educational Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1.3.1 – Provider Safety and Well-Being</strong></td>
<td>C 1.3.1.1 – Discuss the concepts of safety and wellness as they apply to the paramedic.</td>
</tr>
<tr>
<td><strong>1.3.2 – Standard Safety Precautions</strong></td>
<td>C 1.3.2.1 – Identify standard EMS safety precautions.</td>
</tr>
<tr>
<td></td>
<td>1. Handwashing</td>
</tr>
<tr>
<td></td>
<td>2. Adherence to standard precautions / OSHA regulations</td>
</tr>
<tr>
<td></td>
<td>3. Safe operation of EMS / patient care equipment</td>
</tr>
<tr>
<td></td>
<td>4. Environmental control</td>
</tr>
<tr>
<td></td>
<td>5. Occupational health and bloodborne pathogens</td>
</tr>
<tr>
<td></td>
<td>a. Immunizations</td>
</tr>
<tr>
<td></td>
<td>b. Sharps</td>
</tr>
<tr>
<td><strong>1.3.3 – Personal Protective Equipment</strong></td>
<td>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.</td>
</tr>
<tr>
<td><strong>1.3.4 – Stress Management</strong></td>
<td>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.</td>
</tr>
<tr>
<td></td>
<td>1. Acute stress reaction</td>
</tr>
<tr>
<td></td>
<td>2. Delayed stress reaction</td>
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<tr>
<td></td>
<td>3. Cumulative stress reaction</td>
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<tr>
<td></td>
<td>C 1.3.4.2 – Describe the defense mechanisms and management techniques commonly used to deal with stress.</td>
</tr>
<tr>
<td></td>
<td>1. Change in lifestyle</td>
</tr>
<tr>
<td></td>
<td>2. Balance in life</td>
</tr>
<tr>
<td></td>
<td>3. Recognize response to family and friends</td>
</tr>
<tr>
<td></td>
<td>4. Change in work environment</td>
</tr>
<tr>
<td></td>
<td>5. Seek professional assistance</td>
</tr>
<tr>
<td></td>
<td>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.</td>
</tr>
<tr>
<td></td>
<td>1. Denial</td>
</tr>
<tr>
<td></td>
<td>2. Anger</td>
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<tr>
<td></td>
<td>3. Bargaining</td>
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<td></td>
<td>4. Depression</td>
</tr>
<tr>
<td></td>
<td>5. Acceptance</td>
</tr>
<tr>
<td><strong>1.3.5 – Prevention of Work-Related Injuries</strong></td>
<td>C 1.3.5.1 – Identify ways to prevent EMS work-related injuries.</td>
</tr>
<tr>
<td></td>
<td>1. Vehicle restraint systems</td>
</tr>
<tr>
<td></td>
<td>2. Safe lifting techniques</td>
</tr>
<tr>
<td></td>
<td>3. Adequate sleep</td>
</tr>
<tr>
<td></td>
<td>4. Physical fitness and nutrition</td>
</tr>
<tr>
<td></td>
<td>5. Hazard awareness</td>
</tr>
<tr>
<td></td>
<td>6. Adherence to standard precautions / OSHA regulations</td>
</tr>
<tr>
<td></td>
<td>7. Disease transmission prevention (communicable versus bloodborne)</td>
</tr>
<tr>
<td><strong>1.3.6 – Lifting and Moving Patients</strong></td>
<td>C 1.3.6.1 – Differentiate proper from improper body mechanics for lifting and moving patients in emergency and nonemergency situations.</td>
</tr>
<tr>
<td></td>
<td>1. Lifting techniques</td>
</tr>
<tr>
<td></td>
<td>a. Safety precautions</td>
</tr>
<tr>
<td></td>
<td>b. Guidelines for lifting</td>
</tr>
<tr>
<td></td>
<td>2. Safe lifting of cots and stretchers</td>
</tr>
</tbody>
</table>
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.

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

<table>
<thead>
<tr>
<th>Objective</th>
<th>Educational Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1.4.1 – Principles of Medical Documentation and Report Writing</strong></td>
<td></td>
</tr>
</tbody>
</table>
| **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

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

<table>
<thead>
<tr>
<th>Objective</th>
<th>Educational Standard</th>
</tr>
</thead>
</table>
| **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 hearing 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 kind: 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

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Validation</th>
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<tbody>
<tr>
<td>P 1.6.1.6 – Speak clearly.</td>
<td>N/A</td>
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<tr>
<td>A 1.6.1.7 – Listen actively.</td>
<td>N/A</td>
</tr>
<tr>
<td>A 1.6.1.8 – Adjust communication strategies based on the situation.</td>
<td>N/A</td>
</tr>
<tr>
<td>A 1.6.1.9 – Select vocabulary appropriate to the audience.</td>
<td>N/A</td>
</tr>
</tbody>
</table>
## 1.7 – Medical/Legal and Ethics

### Educational Standard

<table>
<thead>
<tr>
<th>Objective</th>
<th>Educational Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1.7.1 – Consent/Refusal of Care</strong></td>
<td></td>
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</tbody>
</table>
| **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 |
### 1.0 – Preparatory

#### 1.7 – Medical/Legal and Ethics

| 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 |
<table>
<thead>
<tr>
<th>C 1.7.4.3 – Describe the elements of negligence, possible defenses to a claim, and potential limitations to civil liability.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1. Concept of negligence</strong></td>
</tr>
<tr>
<td>a. Res ipsa loquitur</td>
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<tr>
<td>b. Negligence per se</td>
</tr>
<tr>
<td><strong>2. Elements of negligence</strong></td>
</tr>
<tr>
<td>a. Duty to act</td>
</tr>
<tr>
<td>i. Contractual</td>
</tr>
<tr>
<td>ii. Duty undertaken</td>
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<tr>
<td>b. Breach of duty</td>
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<tr>
<td>i. Standard of care</td>
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<tr>
<td>ii. Commission</td>
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<tr>
<td>1. Malfeasance</td>
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<tr>
<td>2. Misfeasance</td>
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<tr>
<td>iii. Omission (nonfeasance)</td>
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<tr>
<td>iv. False imprisonment</td>
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<tr>
<td>v. Wrongful death</td>
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<tr>
<td>vi. Abandonment</td>
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<tr>
<td>c. Proximate causation</td>
</tr>
<tr>
<td>d. Damages to plaintiff</td>
</tr>
<tr>
<td>i. Physical (e.g., lost earnings)</td>
</tr>
<tr>
<td>ii. Psychological (e.g., pain and suffering)</td>
</tr>
<tr>
<td>iii. Punitive</td>
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<tr>
<td>e. Defenses</td>
</tr>
<tr>
<td>i. Good Samaritan</td>
</tr>
<tr>
<td>ii. Governmental immunity</td>
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<tr>
<td>iii. Statute of limitations</td>
</tr>
<tr>
<td>iv. Contributory/comparative negligence</td>
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<tr>
<td>f. Protection from liability</td>
</tr>
<tr>
<td>i. Professionalism</td>
</tr>
<tr>
<td>ii. Standard of care</td>
</tr>
<tr>
<td>iii. Liability insurance</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>1.7.5 – Statutory Responsibilities</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>C 1.7.5.1 – Discuss the Medical Practice Act.</strong></td>
</tr>
<tr>
<td>1. Physician responsibilities (competency assurance)</td>
</tr>
<tr>
<td>a. Mandatory training</td>
</tr>
<tr>
<td>b. Skill competency</td>
</tr>
<tr>
<td>c. Run review</td>
</tr>
<tr>
<td>2. Liability of the paramedic medical director</td>
</tr>
<tr>
<td>a. On-line (direct supervision)</td>
</tr>
<tr>
<td>b. Off-line (protocols with standing orders under indirect supervision)</td>
</tr>
<tr>
<td>3. Borrowed servant doctrine (liability for actions of EMTs supervised by the paramedic)</td>
</tr>
</tbody>
</table>

| **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 |
### 1.7.6 – Mandatory Reporting

<table>
<thead>
<tr>
<th>1.7.6.1</th>
<th>Identify when paramedics are legally compelled to notify the authorities.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1. Abuse</td>
</tr>
<tr>
<td></td>
<td>2. Neglect</td>
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<tr>
<td>1.7.6.2</td>
<td>Discuss how reporting requirement arises from special relationship with patient.</td>
</tr>
<tr>
<td></td>
<td>N/A</td>
</tr>
<tr>
<td>1.7.6.3</td>
<td>Describe legal liability for failure to report.</td>
</tr>
<tr>
<td></td>
<td>N/A</td>
</tr>
</tbody>
</table>

### 1.7.7 – Health Care Regulation

| 1.7.7.1 | Describe paramedic scope of practice.                                     |
|         | 1. Licensure                                                              |
|         | a. Occupational regulation                                               |
|         | b. Practicing without a license                                           |
|         | 2. Certification (non-governmental)                                       |
| 1.7.7.2 | Differentiate between licensure and certification.                         |
|         | 1. Jurisdiction-specific                                                  |
|         | 2. Medical control                                                        |
| 1.7.7.3 | Describe credentialing of paramedics.                                     |
|         | 1. Jurisdiction-specific                                                  |
|         | 2. Medical control                                                        |

### 1.7.8 – Patient Rights/Advocacy

| 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)                                         |
| 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

| 1.7.9.1 | Discuss the concept of limited resuscitation efforts.                     |
|         | 1. Health care proxy                                                      |
|         | 2. Medical Orders for Life Sustaining Treatments (“MOLST”)                 |
| 1.7.9.2 | Identify criteria for withholding resuscitation.                          |
|         | Obvious death criteria                                                    |
| 1.7.9.3 | Explain when to terminate                                                  |
|         | 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. |

| C 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 |

| C 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

<table>
<thead>
<tr>
<th>Objective</th>
<th>Educational Standard</th>
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</thead>
<tbody>
<tr>
<td><strong>2.1.1 – Anatomical Terms</strong></td>
<td></td>
</tr>
<tr>
<td>C 2.1.1.1 – Define anatomy.</td>
<td>N/A</td>
</tr>
<tr>
<td>C 2.1.1.2 – Define physiology.</td>
<td>N/A</td>
</tr>
<tr>
<td>C 2.1.1.3 – Define pathophysiology.</td>
<td>N/A</td>
</tr>
<tr>
<td>C 2.1.1.4 – Define homeostasis.</td>
<td>N/A</td>
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</tbody>
</table>

### 2.1.2 – Planes and Sections of the Body

<table>
<thead>
<tr>
<th>Objective</th>
<th>Educational Standard</th>
</tr>
</thead>
</table>
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. Disaccharides
### 2.1.7 – Cell Structure and Function

<table>
<thead>
<tr>
<th><strong>C 2.1.7.1 – Discuss cell theory.</strong></th>
<th>N/A</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>C 2.1.7.2 – Describe cellular anatomy and physiology.</strong></td>
<td></td>
</tr>
<tr>
<td>1. Cell membrane</td>
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<td>2. Cytoplasm</td>
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<td>3. Nucleus and chromosomes</td>
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<td>4. Organelles</td>
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</tr>
<tr>
<td>a. Mitochondria</td>
<td></td>
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<td>b. Lysosomes</td>
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<td>c. Golgi apparatus</td>
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<td>d. Ribosomes</td>
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<tr>
<td>e. Endoplasmic reticulum</td>
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<tr>
<td><strong>C 2.1.7.3 – Explain cellular respiration.</strong></td>
<td></td>
</tr>
<tr>
<td>1. Aerobic</td>
<td></td>
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<tr>
<td>2. Anaerobic</td>
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<tr>
<td><strong>C 2.1.7.4 – Describe the cellular environment.</strong></td>
<td></td>
</tr>
<tr>
<td>1. Water compartments</td>
<td></td>
</tr>
<tr>
<td>a. Intracellular (“ICF”)</td>
<td></td>
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<tr>
<td>b. Extracellular (“ECF”)</td>
<td></td>
</tr>
<tr>
<td>i. Plasma</td>
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<td>ii. Lymph</td>
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<td>iii. Interstitial fluid</td>
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<td>iv. Specialized fluids</td>
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<tr>
<td>1. Synovial</td>
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<td>2. Cerebrospinal</td>
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<td>3. Aqueous humor</td>
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<td>2. Isotonic</td>
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<td>3. Hypotonic</td>
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<td>4. Hypertonic</td>
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<td>5. Acid and base</td>
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<td>a. pH scale</td>
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<tr>
<td>i. Base</td>
<td></td>
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<tr>
<td>ii. Acid</td>
<td></td>
</tr>
<tr>
<td>b. Normal pH ranges of body fluids</td>
<td></td>
</tr>
</tbody>
</table>
### 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
2.1 – Anatomy and Physiology

1. Diaphysis
2. Epiphysis
3. Marrow canal
4. 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. Ilium
   iii. Ischium
   iv. Pubis
   v. Pubic bones
   vi. Pubic symphysis
   vii. Acetabulum
   viii. Femur
   ix. Patella
   x. Tibia
   xi. Fibula
   xii. Tarsals
   xiii. Calcaneus
   xiv. Talus
   xv. Metatarsals
   xvi. Phalanges

8. Classification of joints
   a. Synarthrosis (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

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. Troponymosin
   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
### 2.1.11 – Respiratory System

_C 2.1.11.1 – Describe the anatomy and physiology of the respiratory system._

<table>
<thead>
<tr>
<th>1.</th>
<th>General function of the respiratory system</th>
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<tbody>
<tr>
<td>a.</td>
<td>Upper respiratory tract</td>
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<td>b.</td>
<td>Lower respiratory tract</td>
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<tr>
<th>2.</th>
<th>Structure and functions of the nasal cavities and pharynx</th>
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<tbody>
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<td>a.</td>
<td>Nasal cavities</td>
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<td>i.</td>
<td>Nose</td>
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<td>ii.</td>
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<td>Nasal mucosa</td>
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<td>v.</td>
<td>Olfactory receptors</td>
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<td>i.</td>
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<td>ii.</td>
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<td>iii.</td>
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<td>Laryngopharynx</td>
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<td>Vocal cords</td>
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<td>e.</td>
<td>Glottis</td>
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<th>Structure and functions of the trachea and bronchial tree</th>
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<td>Primary bronchi</td>
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<td>c.</td>
<td>Bronchial tree</td>
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<td>d.</td>
<td>Right and left main-stem bronchi</td>
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<td>e.</td>
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<td>ii.</td>
<td>Visceral pleura</td>
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<td>iii.</td>
<td>Serous fluid</td>
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<td>c.</td>
<td>Hilus</td>
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| 6. | Structure and function of the alveoli and pulmonary capillaries (and surfactant) |

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<td>iv.</td>
<td>Respiration</td>
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<td>v.</td>
<td>Ventilation/perfusion disturbance</td>
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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. Plasma 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. Platelet's 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
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. Salutatory 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. Vestibulocochlear 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
### 2.0 – Anatomy and Physiology

2011 WI Paramedic Curriculum

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<th>2.1 – Anatomy and Physiology</th>
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<td>vii. Skeletal muscles</td>
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<td>viii. Urinary system</td>
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<td>ix. Reproductive system</td>
<td></td>
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</tbody>
</table>

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. Olfactory 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. Conjunctiva (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)
I. 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
2.0 – Anatomy and Physiology

### 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. Calcitonin
9. Parathyroid hormone ("PTH") and calcitonin
10. Pancreas
    a. Islets of Langerhans
       i. Alpha cells
       ii. Beta cells
       iii. Delta cells
    b. Insulin
       i. Diabetes mellitus
       ii. Hyperglycemia
       iii. Hypoglycemia
    c. Glucagon
    d. Somatostatin
11. Relationship between insulin and glucagon
12. Prostaglandins
13. Adrenal glands

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
## 2.1.17 – Renal System

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

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<td>Components of a nephron and the associated blood vessels</td>
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<td>b. Tubular reabsorption</td>
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<td>d. Kidney blood flow</td>
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<td>Kidneys function in maintaining normal blood volume and pressure</td>
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<td>Hormones that affect kidney function</td>
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<td>b. Atrial natriuretic peptide (“ANP”)</td>
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<td>c. Antidiuretic hormone (“ADH”)</td>
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<td>d. Parathyroid hormone (“PTH”)</td>
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<td>12.</td>
<td>Water and electrolyte distribution in the body</td>
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</tbody>
</table>
### 2.18 – Reproductive System

**C 2.18.1 – 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. Genotype Phenotype
   l. Homozygous
   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

### 2.19 – Lymphatic and Immune System

**C 2.19.1 – 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
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
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

<table>
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<th>Objective</th>
<th>Educational Standard</th>
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<tr>
<td><em>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.</em></td>
<td>1. Importance</td>
</tr>
<tr>
<td></td>
<td>2. Basic rules and elements</td>
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<tr>
<td></td>
<td>3. Wood roots, prefixes, and suffixes</td>
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<tr>
<td></td>
<td>4. Literal meanings from medical terms based on word construction</td>
</tr>
<tr>
<td></td>
<td>5. Define common abbreviations and interpret common symbols</td>
</tr>
<tr>
<td></td>
<td>6. Body structure</td>
</tr>
<tr>
<td></td>
<td>7. Body systems</td>
</tr>
</tbody>
</table>
# 4.0 – Pathophysiology

Integrates comprehensive knowledge of pathophysiology of major human systems.

## 4.1 – Pathophysiology

<table>
<thead>
<tr>
<th>Objective</th>
<th>Educational Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>4.1.1 – Introduction – Correlation of Pathophysiology with Disease Process</strong></td>
<td></td>
</tr>
<tr>
<td><em>C 4.1.1.1 – Discuss the correlation of pathophysiology with disease processes.</em></td>
<td>1. Cells appear similar to multicellular “social” organism</td>
</tr>
<tr>
<td></td>
<td>2. Cells communicate electrochemically</td>
</tr>
<tr>
<td></td>
<td>3. Coordination of specific bodily functions</td>
</tr>
<tr>
<td></td>
<td>a. Endocrine</td>
</tr>
<tr>
<td></td>
<td>b. Exocrine</td>
</tr>
<tr>
<td></td>
<td>c. Other coordinating receptors</td>
</tr>
<tr>
<td></td>
<td>i. Chemoreceptors</td>
</tr>
<tr>
<td></td>
<td>ii. Baroreceptors</td>
</tr>
<tr>
<td></td>
<td>iii. Adrenergic</td>
</tr>
<tr>
<td></td>
<td>iv. Others</td>
</tr>
</tbody>
</table>

## 4.1.2 – Basic Cellular Review

<table>
<thead>
<tr>
<th>C 4.1.2.1 – Discuss the major classes of cells.</th>
<th>N/A</th>
</tr>
</thead>
<tbody>
<tr>
<td>C 4.1.2.2 – Describe chief cellular functions.</td>
<td>1. Differentiation or maturation</td>
</tr>
<tr>
<td></td>
<td>2. Perform one function or act in concert with other cells to perform a more complex task</td>
</tr>
<tr>
<td>C 4.1.2.3 – Describe cellular components, their structures, and functions.</td>
<td>1. Structure and function</td>
</tr>
<tr>
<td></td>
<td>2. Three main components</td>
</tr>
</tbody>
</table>

## 4.1.4 – 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                                                                        |
4.0 – Pathophysiology

4.1.3 – Discuss the manifestation of cellular injury.

1. Cellular manifestations
2. Systemic manifestations

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

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.

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
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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 4.1.3.4 – Describe cellular death / necrosis.

N/A
### 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**

### 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

### 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**
4.0 – Pathophysiology

4.1.5 – Genetics and Familial Diseases

<table>
<thead>
<tr>
<th>4.1.5.1 – Identify factors that cause disease.</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Genetic</td>
<td>1.</td>
<td>Genetic</td>
</tr>
<tr>
<td>Environmental</td>
<td>2.</td>
<td>Environmental</td>
</tr>
<tr>
<td>a. Microorganisms and immunologic exposures</td>
<td>a.</td>
<td>Microorganisms and immunologic exposures</td>
</tr>
<tr>
<td>b. Personal habits and lifestyle</td>
<td>b.</td>
<td>Personal habits and lifestyle</td>
</tr>
<tr>
<td>c. Chemical substances</td>
<td>c.</td>
<td>Chemical substances</td>
</tr>
<tr>
<td>d. Physical environment</td>
<td>d.</td>
<td>Physical environment</td>
</tr>
<tr>
<td>e. Psychosocial environment</td>
<td>e.</td>
<td>Psychosocial environment</td>
</tr>
<tr>
<td>3. Age and gender</td>
<td>3.</td>
<td>Age and gender</td>
</tr>
<tr>
<td>a. Accumulative affects of both genetic and environmental factors</td>
<td>a.</td>
<td>Accumulative affects of both genetic and environmental factors</td>
</tr>
<tr>
<td>b. Lifestyle, anatomic, or hormonal differences</td>
<td>b.</td>
<td>Lifestyle, anatomic, or hormonal differences</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>4.1.5.2 – Analyze disease risk.</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Disease rates</td>
<td>1.</td>
<td>Disease rates</td>
</tr>
<tr>
<td>a. Incidence rate</td>
<td>a.</td>
<td>Incidence rate</td>
</tr>
<tr>
<td>b. Prevalence rate</td>
<td>b.</td>
<td>Prevalence rate</td>
</tr>
<tr>
<td>c. Mortality rate</td>
<td>c.</td>
<td>Mortality rate</td>
</tr>
<tr>
<td>2. Risk factor analysis</td>
<td>2.</td>
<td>Risk factor analysis</td>
</tr>
<tr>
<td>b. Noncausal risk factors</td>
<td>b.</td>
<td>Noncausal risk factors</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>4.1.5.3 – Describe the combined effects and interaction among risk factors.</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Familial disease tendency</td>
<td>1.</td>
<td>Familial disease tendency</td>
</tr>
<tr>
<td>2. Aging and age-related disorders</td>
<td>2.</td>
<td>Aging and age-related disorders</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>4.1.5.4 – Describe familial disease and associated risk factors.</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Immunologic disorders</td>
<td>1.</td>
<td>Immunologic disorders</td>
</tr>
<tr>
<td>a. Allergies</td>
<td>a.</td>
<td>Allergies</td>
</tr>
<tr>
<td>b. Asthma</td>
<td>b.</td>
<td>Asthma</td>
</tr>
<tr>
<td>c. Rheumatic fever</td>
<td>c.</td>
<td>Rheumatic fever</td>
</tr>
<tr>
<td>2. Cancer</td>
<td>2.</td>
<td>Cancer</td>
</tr>
<tr>
<td>a. Breast cancer</td>
<td>a.</td>
<td>Breast cancer</td>
</tr>
<tr>
<td>b. Colorectal cancer</td>
<td>b.</td>
<td>Colorectal cancer</td>
</tr>
<tr>
<td>c. Lung cancer</td>
<td>c.</td>
<td>Lung cancer</td>
</tr>
<tr>
<td>3. Endocrine disorders – Diabetes mellitus</td>
<td>3.</td>
<td>Endocrine disorders – Diabetes mellitus</td>
</tr>
<tr>
<td>a. Insulin-dependent diabetes mellitus</td>
<td>a.</td>
<td>Insulin-dependent diabetes mellitus</td>
</tr>
<tr>
<td>b. Non-insulin dependent diabetes mellitus</td>
<td>b.</td>
<td>Non-insulin dependent diabetes mellitus</td>
</tr>
<tr>
<td>a. Drug-induces hemolytic anemia</td>
<td>a.</td>
<td>Drug-induces hemolytic anemia</td>
</tr>
<tr>
<td>b. Hemophilia</td>
<td>b.</td>
<td>Hemophilia</td>
</tr>
</tbody>
</table>

4.1 – Pathophysiology
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 (urate 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.

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Decreased cardiac output</td>
</tr>
<tr>
<td>2.</td>
<td>Compensatory mechanisms</td>
</tr>
<tr>
<td>a.</td>
<td>Catecholamine release</td>
</tr>
<tr>
<td>i.</td>
<td>Epinephrine and norepinephrine</td>
</tr>
<tr>
<td>ii.</td>
<td>Increase in systemic vascular resistance</td>
</tr>
<tr>
<td>b.</td>
<td>Role of aldosterone, renin-angiotensin, and ADH</td>
</tr>
<tr>
<td>i.</td>
<td>Adequate or increased blood volume</td>
</tr>
<tr>
<td>ii.</td>
<td>Vasoconstriction increases systemic blood pressure</td>
</tr>
<tr>
<td>c.</td>
<td>Shift of interstitial fluid</td>
</tr>
<tr>
<td>d.</td>
<td>Splenic discharge</td>
</tr>
<tr>
<td>3.</td>
<td>Increased preload stroke volume, and heart rate</td>
</tr>
<tr>
<td>a.</td>
<td>Increased myocardial oxygen demand</td>
</tr>
<tr>
<td>b.</td>
<td>Systemic and pulmonary edema</td>
</tr>
<tr>
<td>i.</td>
<td>Dyspnea</td>
</tr>
<tr>
<td>ii.</td>
<td>Dusky skin color</td>
</tr>
<tr>
<td>iii.</td>
<td>Low blood pressure</td>
</tr>
<tr>
<td>iv.</td>
<td>Oliguria</td>
</tr>
<tr>
<td>v.</td>
<td>Impaired mentation</td>
</tr>
<tr>
<td>c.</td>
<td>Decreased cardiac output and ejection fraction</td>
</tr>
<tr>
<td>i.</td>
<td>Decreased blood pressure</td>
</tr>
<tr>
<td>ii.</td>
<td>Decreased tissue perfusion</td>
</tr>
<tr>
<td>iii.</td>
<td>Impaired cellular metabolism</td>
</tr>
</tbody>
</table>
### C 4.1.6.2 – Differentiate between the different types of shock, their pathophysiology, evaluation, and treatment.

<table>
<thead>
<tr>
<th>Type of Shock</th>
<th>1. Defined</th>
<th>b. Pathophysiology</th>
<th>c. Evaluation and treatment</th>
</tr>
</thead>
</table>

### C 4.1.6.3 – Explain multiple organ dysfunction syndrome ("MODS").

<table>
<thead>
<tr>
<th>MODS</th>
<th>1. Defined</th>
<th>a. Progressive failure of two or more organ systems</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>b. Occurs after severe illness or injury</td>
<td></td>
</tr>
<tr>
<td></td>
<td>c. New diagnosis first described in 1975</td>
<td></td>
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<tr>
<td></td>
<td>d. Mortality rate of 60% to 90%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>e. Major cause of death following septic, traumatic, and brain injuries</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2. Pathophysiology</td>
<td></td>
</tr>
<tr>
<td></td>
<td>a. Injury or endotoxin release</td>
<td></td>
</tr>
<tr>
<td></td>
<td>b. Vascular endothelial damage, neuroendocrine response, and release of inflammatory mediators</td>
<td></td>
</tr>
<tr>
<td></td>
<td>c. Activation of complement, coagulation, and kallikrein/kinnin systems</td>
<td></td>
</tr>
<tr>
<td></td>
<td>d. Massive systemic immune/inflammatory and coagulation responses</td>
<td></td>
</tr>
<tr>
<td></td>
<td>e. Vascular changes</td>
<td></td>
</tr>
<tr>
<td></td>
<td>i. Vasodilation</td>
<td></td>
</tr>
<tr>
<td></td>
<td>ii. Increase in capillary permeability</td>
<td></td>
</tr>
<tr>
<td></td>
<td>iii. Selective vasoconstriction</td>
<td></td>
</tr>
<tr>
<td></td>
<td>iv. Microvascular thrombi</td>
<td></td>
</tr>
<tr>
<td></td>
<td>f. Maldistribution of systemic and organ blood flow</td>
<td></td>
</tr>
<tr>
<td></td>
<td>g. Hypermetabolism</td>
<td></td>
</tr>
<tr>
<td></td>
<td>h. Oxygen supply/demand imbalance</td>
<td></td>
</tr>
<tr>
<td></td>
<td>i. Tissue hypoxia</td>
<td></td>
</tr>
<tr>
<td></td>
<td>i. Tissue hypoperfusion</td>
<td></td>
</tr>
<tr>
<td></td>
<td>ii. Exhaustion of fuel supply (i.e., ATP, glucose, etc.)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>iii. Metabolic failure</td>
<td></td>
</tr>
<tr>
<td></td>
<td>iv. Lysosome breakdown</td>
<td></td>
</tr>
<tr>
<td></td>
<td>v. Anaerobic metabolism</td>
<td></td>
</tr>
<tr>
<td></td>
<td>vi. Acidosis and impaired cellular function</td>
<td></td>
</tr>
<tr>
<td></td>
<td>j. Organ dysfunction</td>
<td></td>
</tr>
<tr>
<td></td>
<td>i. Decreased cardiac function and myocardial depression</td>
<td></td>
</tr>
<tr>
<td></td>
<td>ii. Renal failure</td>
<td></td>
</tr>
<tr>
<td></td>
<td>iii. Failure of smooth muscle of vascular system</td>
<td></td>
</tr>
</tbody>
</table>
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")
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. Bacterial 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 4.1.6 – 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
### 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
### 4.0 – Pathophysiology

<table>
<thead>
<tr>
<th>4.1.9.2 – Discuss immunity and inflammation deficiencies.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Congenital immune deficiencies</td>
</tr>
<tr>
<td>2. Acquired deficiencies</td>
</tr>
<tr>
<td>a. Nutritional deficiencies</td>
</tr>
<tr>
<td>b. Iatrogenic deficiencies</td>
</tr>
<tr>
<td>c. Deficiencies caused by trauma</td>
</tr>
<tr>
<td>d. Deficiencies caused by stress</td>
</tr>
<tr>
<td>e. AIDS</td>
</tr>
<tr>
<td>3. Replacement therapies for immune deficiencies</td>
</tr>
<tr>
<td>a. Gamma globulin therapy</td>
</tr>
<tr>
<td>b. Transplantation and transfusion</td>
</tr>
<tr>
<td>c. Gene therapy</td>
</tr>
</tbody>
</table>

### 4.1.10 – Stress and Disease

<table>
<thead>
<tr>
<th>4.1.10.1 – Discuss concepts related to stress.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Triad of manifestation</td>
</tr>
<tr>
<td>2. General adaptation syndrome (Selye)</td>
</tr>
<tr>
<td>a. Alarm stage</td>
</tr>
<tr>
<td>b. Resistance or adaptation stage</td>
</tr>
<tr>
<td>c. Exhaustion stage</td>
</tr>
<tr>
<td>d. Definition of physiological stress</td>
</tr>
<tr>
<td>3. Psychologic mediators and specificity</td>
</tr>
<tr>
<td>a. Psychologic factors' effect on physiological responses to stress</td>
</tr>
<tr>
<td>b. Pituitary gland and adrenal cortex sensitivity to emotional, psychologic, and social influences</td>
</tr>
<tr>
<td>4. Homeostasis as a dynamic steady state</td>
</tr>
<tr>
<td>a. Definitions</td>
</tr>
<tr>
<td>i. Dynamic steady state</td>
</tr>
<tr>
<td>ii. Turnover</td>
</tr>
<tr>
<td>b. Reaction of body to stressors</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>4.1.10.2 – Discuss stress responses.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Psychoneuroimmunologic response</td>
</tr>
<tr>
<td>a. Interaction of consciousness, brain and central</td>
</tr>
</tbody>
</table>
### 4.1 – Pathophysiology

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. $\text{Alpha}_1$
   2. $\text{Alpha}_2$
   3. $\text{Beta}_1$
   4. $\text{Beta}_2$

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
### C 4.1.10.3 – Discuss the interrelationships between stress, coping, and illness.

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Stress as interdependent processes</td>
</tr>
<tr>
<td>a.</td>
<td>Definition of physiologic stress and psychologic distress</td>
</tr>
<tr>
<td>b.</td>
<td>Effects of psychologic distress</td>
</tr>
<tr>
<td>c.</td>
<td>Relationship between distress and immune dysfunction</td>
</tr>
<tr>
<td>2.</td>
<td>Potential stress effects on:</td>
</tr>
<tr>
<td>a.</td>
<td>Health individuals</td>
</tr>
<tr>
<td>i.</td>
<td>Ineffective coping</td>
</tr>
<tr>
<td>ii.</td>
<td>Effective coping</td>
</tr>
<tr>
<td>b.</td>
<td>Symptomatic individuals</td>
</tr>
<tr>
<td>i.</td>
<td>Ineffective coping</td>
</tr>
<tr>
<td>ii.</td>
<td>Effective coping</td>
</tr>
<tr>
<td>c.</td>
<td>Medical interventions</td>
</tr>
<tr>
<td>i.</td>
<td>Ineffective coping</td>
</tr>
<tr>
<td>ii.</td>
<td>Effective coping</td>
</tr>
</tbody>
</table>
5.0 – Life Span Development

Integrates comprehensive knowledge of life span development.

5.1 – Life Span Development

<table>
<thead>
<tr>
<th>Objective</th>
<th>Educational Standard</th>
</tr>
</thead>
</table>
| 5.1.1 – Infancy (Birth to One Year) | 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)
### 5.0 – Life Span Development

#### 5.1.2 - Discuss the physiological and psychosocial characteristics of toddlers and pre-school age children.

1. **Physiological**
   - Vital signs
     1. Heart rate
     2. Respiratory rate
     3. Systolic blood pressure
     4. Temperature
   - **Weight**
   - **Cardiovascular system**
   - **Pulmonary system**
   - **Renal system**
   - **Immune system**
   - **Nervous system**
   - **Musculoskeletal system**
   - **Dental system**
   - **Elimination patterns (toilet training)**
   - **Sensory**

2. **Psychosocial**
   - **Cognitive**
   - **Play**
   - **Sibling relationships**
   - **Peer group functions**
   - Parenting styles and its effect on children
     1. Authoritarian parenting
     2. Authoritative parenting
     3. Permissive-indifferent parenting
     4. Permissive-indulgent parenting
   - **Divorce effects on child development**
   - **Television**
   - **Modeling**

#### 5.1.3 – School Age Children (Six to 12 Years)

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

1. **Physiological**
   - Vital signs
     1. Heart rate
     2. Respiratory rate
     3. Systolic blood pressure
     4. Temperature
   - **Growth rate**
   - **Bodily functions**

2. **Psychosocial**
   - **Families**
   - **Develop self-concept**
   - **Moral development**
     1. Pre-conventional reasoning
     2. Conventional reasoning
     3. Post-conventional reasoning
     4. Individuals move through development at different rates

#### 5.1.4 – Adolescence (13 to 18 Years)

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

1. **Physiological**
   - Vital signs
     1. Heart rate
     2. Respiratory rate
     3. Blood pressure
### 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.**

<table>
<thead>
<tr>
<th>1. Physiological – Vital signs</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Heart rate</td>
</tr>
<tr>
<td>b. Respiratory rate</td>
</tr>
<tr>
<td>c. Blood pressure</td>
</tr>
<tr>
<td>d. Temperature</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>2. Psychosocial</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Family</td>
</tr>
<tr>
<td>b. Develop identity</td>
</tr>
<tr>
<td>c. Ethical development</td>
</tr>
</tbody>
</table>

### 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.**

<table>
<thead>
<tr>
<th>1. Physiological</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Vital signs</td>
</tr>
<tr>
<td>i. Heart rate</td>
</tr>
<tr>
<td>ii. Respiratory rate</td>
</tr>
<tr>
<td>iii. Blood pressure</td>
</tr>
<tr>
<td>iv. Temperature</td>
</tr>
<tr>
<td>b. Varying degrees of degradation</td>
</tr>
<tr>
<td>c. Vision</td>
</tr>
<tr>
<td>d. Hearing</td>
</tr>
<tr>
<td>e. Cardiovascular health</td>
</tr>
<tr>
<td>i. Cardiac output</td>
</tr>
<tr>
<td>ii. Cholesterol</td>
</tr>
<tr>
<td>f. Cancer</td>
</tr>
<tr>
<td>g. Weight control</td>
</tr>
<tr>
<td>h. Menopause</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>2. Psychosocial</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Social clock</td>
</tr>
<tr>
<td>b. Approach to problems</td>
</tr>
<tr>
<td>c. Empty-nest syndrome</td>
</tr>
<tr>
<td>d. Often burdened by financial commitments</td>
</tr>
</tbody>
</table>

### 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.**

<table>
<thead>
<tr>
<th>1. Physiological</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Vital signs</td>
</tr>
<tr>
<td>i. Heart rate</td>
</tr>
<tr>
<td>ii. Respiratory rate status</td>
</tr>
<tr>
<td>iii. Blood pressure</td>
</tr>
<tr>
<td>iv. Temperature</td>
</tr>
<tr>
<td>b. Life span</td>
</tr>
</tbody>
</table>

### Temperature

#### b. Growth rate

- Secondary sexual development occurs
- Endocrine changes
  1. Female
  2. Male
- Reproductive maturity
- Muscle mass and bone growth
- Body fat
- Blood chemistry nearly equal to adult levels
- Skin toughens

### Life Span

- Vital signs
  - Heart rate
  - Respiratory rate
  - Blood pressure
  - Temperature
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

<table>
<thead>
<tr>
<th>Objective</th>
<th>Educational Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>C 6.1.1.2 – Discuss public health laws, regulations, and guidelines.</td>
<td>N/A</td>
</tr>
</tbody>
</table>
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

<table>
<thead>
<tr>
<th>Objective</th>
<th>Educational Standard</th>
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<tbody>
<tr>
<td><strong>7.1.1 – Medication Safety</strong></td>
<td>N/A</td>
</tr>
<tr>
<td>C 7.1.1.1 – Describe the importance of medication safety in providing quality EMS care.</td>
<td></td>
</tr>
</tbody>
</table>

| **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 |
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
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

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
<table>
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<tr>
<th>Section</th>
<th>Content</th>
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<tr>
<td><strong>7.0 – Pharmacology</strong></td>
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<tr>
<td><strong>7.1 – Principles of Pharmacology</strong></td>
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</table>

| C 7.1.6.2 – Discuss considerations for storing and securing medications and controlled substances. | 1. Storage  
2. Accountability |
| C 7.1.8 – Phases of Medication Activity | N/A |
| C 7.1.8.1 – List the phases of medication activity. | N/A |
| C 7.1.9 – Medication Interactions | 1. Intestinal absorption  
2. Competition for plasma protein binding  
3. Biotransformation  
4. Drug metabolism  
5. Renal excretion  
6. Drug-drug interaction |
| C 7.1.10 – Toxicity | N/A |
| C 7.1.10.1 – Describe toxicity concerns regarding medication administration. | N/A |
| C 7.1.11 – Drug Terminology | 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 |
| C 7.1.12 – Sources of Drugs | 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 |
| C 7.1.13 – Pharmacological Concepts | 1. Pharmacokinetics  
   a. Absorption  
      i. Solubility  
      ii. Bioavailability  
2. Pharmacodynamics |
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
<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>15.</td>
<td>Cumulative effect</td>
</tr>
<tr>
<td>16.</td>
<td>Drug dependence</td>
</tr>
<tr>
<td>17.</td>
<td>Drug antagonism</td>
</tr>
<tr>
<td>18.</td>
<td>Summation (addition or additive effect)</td>
</tr>
<tr>
<td>19.</td>
<td>Synergism</td>
</tr>
<tr>
<td>20.</td>
<td>Potentiation</td>
</tr>
<tr>
<td>21.</td>
<td>Interference</td>
</tr>
<tr>
<td>22.</td>
<td>Toxicity</td>
</tr>
</tbody>
</table>
# 7.2 – Medication Administration

<table>
<thead>
<tr>
<th>Objective</th>
<th>Educational Standard</th>
</tr>
</thead>
</table>
| **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 7.2.2.3 – Explain the proper technique for administering medications via various routes (include advantages and disadvantages associated with each route).

1. Peripheral venous cannulation  
2. Intraosseous  
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
<table>
<thead>
<tr>
<th><strong>7.2.3 – Standardization of Drugs</strong></th>
<th></th>
</tr>
</thead>
</table>
| **C 7.2.3.1 – Discuss standardization of drugs.** | 1. Techniques to assure purity and potency  
2. Generic drugs |  |

<table>
<thead>
<tr>
<th><strong>7.2.4 – Medication Classifications</strong></th>
<th></th>
</tr>
</thead>
</table>
| **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.)

<table>
<thead>
<tr>
<th>Objectives</th>
<th>Educational Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>7.3.1 – Specific Medications</strong></td>
<td></td>
</tr>
<tr>
<td><strong>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.</strong></td>
<td></td>
</tr>
<tr>
<td>1. Activated Charcoal</td>
<td></td>
</tr>
<tr>
<td>2. Adenosine</td>
<td></td>
</tr>
<tr>
<td>3. Albuterol</td>
<td></td>
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<tr>
<td>4. Amiodarone</td>
<td></td>
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<tr>
<td>5. Amyl Nitrite</td>
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<tr>
<td>6. Aspirin</td>
<td></td>
</tr>
<tr>
<td>7. Atropine</td>
<td></td>
</tr>
<tr>
<td>8. Dextrose (50%, 25%, 10%)</td>
<td></td>
</tr>
<tr>
<td>9. Diazepam</td>
<td></td>
</tr>
<tr>
<td>10. Diltiazem</td>
<td></td>
</tr>
<tr>
<td>11. Diphenhydramine HCl</td>
<td></td>
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<tr>
<td>12. Dopamine</td>
<td></td>
</tr>
<tr>
<td>13. Epinephrine</td>
<td></td>
</tr>
<tr>
<td>14. Fentanyl</td>
<td></td>
</tr>
<tr>
<td>15. Glucagon</td>
<td></td>
</tr>
<tr>
<td>16. Intravenous Fluids</td>
<td></td>
</tr>
<tr>
<td>a. Dextrose 5% in water</td>
<td></td>
</tr>
<tr>
<td>b. Normal saline</td>
<td></td>
</tr>
<tr>
<td>c. Lactated ringer’s</td>
<td></td>
</tr>
<tr>
<td>17. Ipratropium</td>
<td></td>
</tr>
<tr>
<td>18. Lidocaine</td>
<td></td>
</tr>
<tr>
<td>19. Lorazepam</td>
<td></td>
</tr>
<tr>
<td>20. Magnesium</td>
<td></td>
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<tr>
<td>21. Midazolam</td>
<td></td>
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<tr>
<td>22. Morphine</td>
<td></td>
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<tr>
<td>23. Naloxone</td>
<td></td>
</tr>
<tr>
<td>24. Nitroglycerin</td>
<td></td>
</tr>
<tr>
<td>a. Paste</td>
<td></td>
</tr>
<tr>
<td>b. Spray</td>
<td></td>
</tr>
<tr>
<td>c. Tablets</td>
<td></td>
</tr>
<tr>
<td>25. Nitrous Oxide</td>
<td></td>
</tr>
<tr>
<td>26. Oxygen</td>
<td></td>
</tr>
<tr>
<td>27. Oxytocin</td>
<td></td>
</tr>
<tr>
<td>28. Promethazine HCl</td>
<td></td>
</tr>
<tr>
<td>29. Thiamine</td>
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</tr>
</tbody>
</table>
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

<table>
<thead>
<tr>
<th>Objective</th>
<th>Educational Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>8.1.1 – Airway Anatomy</strong></td>
<td>C 8.1.1.1 – Describe the anatomy of the respiratory system.</td>
</tr>
<tr>
<td>1. Sinuses</td>
<td>1. Epiglottis</td>
</tr>
<tr>
<td>a. Fontal</td>
<td>2. Arytenoid cartilage</td>
</tr>
<tr>
<td>b. Sphenoid</td>
<td>a. Corniculate cartilage</td>
</tr>
<tr>
<td>c. Ethmoid</td>
<td>b. Cuneiform cartilage</td>
</tr>
<tr>
<td>d. Maxillary</td>
<td>c. Posterior arytenoids</td>
</tr>
<tr>
<td>2. Upper airway tract</td>
<td>3. Vocal cords</td>
</tr>
<tr>
<td>a. Nose</td>
<td>a. False vocal cord</td>
</tr>
<tr>
<td>b. Mouth and oral cavity</td>
<td>b. True vocal cord</td>
</tr>
<tr>
<td>c. Jaw</td>
<td>4. Thyroid cartilage</td>
</tr>
<tr>
<td>d. Pharynx</td>
<td>5. Cricoid ring</td>
</tr>
<tr>
<td>i. Nasopharynx</td>
<td>a. Arch of cricoid cartilage</td>
</tr>
<tr>
<td>ii. Oropharynx</td>
<td>b. Lamina of cricoid cartilage</td>
</tr>
<tr>
<td>iii. Hypopharynx</td>
<td>c. Cricothyroid membrane (ligament)</td>
</tr>
<tr>
<td>e. Larynx</td>
<td>3. Jugular notch</td>
</tr>
<tr>
<td>i. Cartilages</td>
<td>4. Lower airway tract</td>
</tr>
<tr>
<td>1. Epiglottis</td>
<td>a. Trachea (spatial relationship to esophagus)</td>
</tr>
<tr>
<td>2. Arytenoid cartilage</td>
<td>b. Carina (Angle of Louis)</td>
</tr>
<tr>
<td>a. Corniculate cartilage</td>
<td>c. Bronchi</td>
</tr>
<tr>
<td>b. Cuneiform cartilage</td>
<td>d. Lungs</td>
</tr>
<tr>
<td>c. Posterior arytenoids</td>
<td>i. Bronchioles</td>
</tr>
</tbody>
</table>
1. Bronchial smooth muscle
2. Beta₂ adrenergic receptors
   i. Pulmonary cilia
   ii. 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)
### 8.0 – Airway Management, Respiration, and Artificial Ventilation

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<table>
<thead>
<tr>
<th>Procedures (refer to Wisconsin Scope of Practice).</th>
<th></th>
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</thead>
<tbody>
<tr>
<td>b. Nasal (nasopharyngeal)</td>
<td></td>
</tr>
<tr>
<td>c. Oral (oropharyngeal)</td>
<td></td>
</tr>
<tr>
<td>2. Bag valve mask (“BVM”)</td>
<td></td>
</tr>
<tr>
<td>3. Chest decompression (needle)</td>
<td></td>
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<tr>
<td>4. CO monitoring</td>
<td></td>
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<tr>
<td>5. CPAP / BiPAP</td>
<td></td>
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<td>6. PEEP</td>
<td></td>
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<tr>
<td>7. Cricoid pressure (Sellick’s maneuver)</td>
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</tr>
<tr>
<td>8. Cricothyrotomy (surgical/needle)</td>
<td></td>
</tr>
<tr>
<td>9. End tidal CO₂ monitoring</td>
<td></td>
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<tr>
<td>10. Gastric decompression (NG tube)</td>
<td></td>
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<tr>
<td>11. Intubation</td>
<td></td>
</tr>
<tr>
<td>a. Lighted stylet</td>
<td></td>
</tr>
<tr>
<td>b. Medication assisted (non-paralytic)</td>
<td></td>
</tr>
<tr>
<td>c. Medication assisted with paralytics (RSI)</td>
<td></td>
</tr>
<tr>
<td>d. Nasotracheal</td>
<td></td>
</tr>
<tr>
<td>e. Endotracheal</td>
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<tr>
<td>12. Manual airway maneuvers</td>
<td></td>
</tr>
<tr>
<td>a. Heat-tilt, chin-lift</td>
<td></td>
</tr>
<tr>
<td>b. Jaw thrust</td>
<td></td>
</tr>
<tr>
<td>c. Modified jaw thrust</td>
<td></td>
</tr>
<tr>
<td>13. Obstruction</td>
<td></td>
</tr>
<tr>
<td>a. Forceps and laryngoscope (direct visual)</td>
<td></td>
</tr>
<tr>
<td>b. Manual</td>
<td></td>
</tr>
<tr>
<td>14. Oxygen therapy</td>
<td></td>
</tr>
<tr>
<td>a. Nebulizer</td>
<td></td>
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<tr>
<td>b. Nasal cannula</td>
<td></td>
</tr>
<tr>
<td>c. Non-rebreather mask</td>
<td></td>
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<tr>
<td>d. Simple face mask</td>
<td></td>
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<tr>
<td>e. Humidifier</td>
<td></td>
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<tr>
<td>f. Partial rebreather</td>
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<tr>
<td>g. Venturi mask</td>
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<tr>
<td>h. Regulators</td>
<td></td>
</tr>
<tr>
<td>15. Pulse oximetry</td>
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<tr>
<td>16. Suctioning</td>
<td></td>
</tr>
<tr>
<td>a. Tracheobronchial</td>
<td></td>
</tr>
<tr>
<td>b. Upper airway (soft and rigid)</td>
<td></td>
</tr>
<tr>
<td>17. Ventilators</td>
<td></td>
</tr>
<tr>
<td>a. Demand valve (manually triggered ventilation)</td>
<td></td>
</tr>
<tr>
<td>b. Automated transport (“ATV”)</td>
<td></td>
</tr>
<tr>
<td>18. Chest tube monitoring</td>
<td></td>
</tr>
</tbody>
</table>

### 8.1.4 – Consider Age-Related Variations in Pediatric and Geriatric Patients

<table>
<thead>
<tr>
<th>C 8.1.4.1 – Compare ventilation techniques used for an adult patient to those used for pediatric patients.</th>
<th>N/A</th>
</tr>
</thead>
<tbody>
<tr>
<td>C 8.1.4.2 – Describe special considerations in airway management and ventilation for the pediatric patient.</td>
<td>N/A</td>
</tr>
</tbody>
</table>
8.2 – Respiration

<table>
<thead>
<tr>
<th>Objective</th>
<th>Educational Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>8.2.1 – Anatomy of the Respiratory System</strong></td>
<td></td>
</tr>
<tr>
<td>[ C 8.2.1.1 – See 8.1.1 ]</td>
<td>N/A</td>
</tr>
<tr>
<td><strong>8.2.2 – Physiology of Respiration</strong></td>
<td></td>
</tr>
</tbody>
</table>
| \[ C 8.2.2.1 – Discuss the means by which the body controls respiration. \] | 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. \( P_{\text{aO}_2} \)  
         iii. \( P_{\text{aCO}_2} \) |
### 8.2.2.2.3 – 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

### 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.

### 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
### 8.2.3.2 – Discuss causes for interruption of oxygenation.

<table>
<thead>
<tr>
<th>N/A</th>
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</thead>
</table>

### 8.2.3.3 – List reasons for inadequate respiration.

<table>
<thead>
<tr>
<th>1. External</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Deficiencies due to environmental factors</td>
</tr>
<tr>
<td>i. Altitude</td>
</tr>
<tr>
<td>ii. Closed environments</td>
</tr>
<tr>
<td>iii. Toxic or poisonous environments</td>
</tr>
<tr>
<td>b. Carbon dioxide retention</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>2. Internal</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Pathology typically related to changes in alveolar-capillary gas exchange</td>
</tr>
<tr>
<td>b. Typical disease processes</td>
</tr>
<tr>
<td>i. Emphysema</td>
</tr>
<tr>
<td>ii. Pulmonary edema</td>
</tr>
<tr>
<td>iii. Pneumonia</td>
</tr>
<tr>
<td>iv. Environmental/occupational exposure</td>
</tr>
<tr>
<td>v. Drowning</td>
</tr>
<tr>
<td>c. Cellular</td>
</tr>
</tbody>
</table>

### 8.2.3.4 – Discuss rapid ventilation, exhaustion, and dead space air movement as contributory factors for inadequate respiration.

<table>
<thead>
<tr>
<th>N/A</th>
</tr>
</thead>
</table>

### 8.2.3.5 – Identify possible mechanical ventilation problems resulting in inadequate respiration.

<table>
<thead>
<tr>
<th>Moving noncompliant lungs.</th>
</tr>
</thead>
</table>

### 8.2.3.6 – Discuss concerns regarding breathing against an elevated diaphragm.

<table>
<thead>
<tr>
<th>N/A</th>
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</thead>
</table>

### 8.2.3.7 – Discuss pneumonia, emphysema, and trauma as they relate to a decrease in lung compliance.

<table>
<thead>
<tr>
<th>N/A</th>
</tr>
</thead>
</table>

### 8.2.3.8 – Discuss the concept of ventilation-perfusion mismatch.

<table>
<thead>
<tr>
<th>1. Ventilation defects</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Pulmonary edema</td>
</tr>
<tr>
<td>b. Pneumonia</td>
</tr>
<tr>
<td>c. Atelectasis</td>
</tr>
<tr>
<td>d. Obstruction due to mucus plugs</td>
</tr>
<tr>
<td>e. Increased dead space ventilation due to emphysema</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>2. Perfusion defects</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Pulmonary emboli</td>
</tr>
<tr>
<td>b. Disruption of the normal chest architecture</td>
</tr>
</tbody>
</table>

### 8.2.3.9 – Discuss disruptions in oxygen transport associated with diminished oxygen carrying capacity.

| 1. Anemia |
| 2. Blood loss |

### 8.2.3.10 – List causes for disruption in effective circulation.

<table>
<thead>
<tr>
<th>1. Shock</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Blood loss</td>
</tr>
<tr>
<td>b. Diminished peripheral resistance</td>
</tr>
<tr>
<td>c. Cardiac failure</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>2. Emboli</th>
</tr>
</thead>
</table>
### 8.2.3.11 — Identify disruptions that can occur at the cellular level to impede adequate respiration.

<table>
<thead>
<tr>
<th>3.</th>
<th>Increased capillary permeability</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Acid-base balance</td>
</tr>
<tr>
<td>2.</td>
<td>Poisons/toxins</td>
</tr>
<tr>
<td>3.</td>
<td>Blood sugar changes</td>
</tr>
<tr>
<td>4.</td>
<td>Hormone effects</td>
</tr>
<tr>
<td>5.</td>
<td>Drugs</td>
</tr>
<tr>
<td>6.</td>
<td>Hypoxia</td>
</tr>
</tbody>
</table>

### 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 |
8.0 – Airway Management, Respiration, and Artificial Ventilation

<table>
<thead>
<tr>
<th>8.2.6 – Supplemental Oxygen Therapy</th>
</tr>
</thead>
<tbody>
<tr>
<td>C 8.2.6.1 – Discuss oxygen administration for the patient with hypercapnia.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>8.2.7 – Age-Related Variations in Pediatric and Geriatric Patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>C 8.2.7.1 – Describe special considerations in airway management and ventilation for pediatric patients.</td>
</tr>
</tbody>
</table>
# 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. PaCO₂  
   c. PaO₂  
   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 |
**8.3.3.3 – Discuss the use of BiPAP/CPAP in assisting patient ventilations.**

1. **Purpose**
2. **Indications**
3. **Contraindications**
4. **Complications**
5. **Procedures**

**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

<table>
<thead>
<tr>
<th>Objective</th>
<th>Educational Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>9.1.1 – Scene Safety</strong></td>
<td></td>
</tr>
</tbody>
</table>
| 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 |
### 9.0 – Patient Assessment

**2011 WI Paramedic Curriculum**

| **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.

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Number of patients and need for additional support.</td>
<td></td>
</tr>
<tr>
<td>a. How many patients?</td>
<td></td>
</tr>
<tr>
<td>b. Does the dispatch information suggest the need for additional support?</td>
<td></td>
</tr>
<tr>
<td>c. Protection of the patient</td>
<td></td>
</tr>
<tr>
<td>d. Protection of bystanders</td>
<td></td>
</tr>
<tr>
<td>i. Remove</td>
<td></td>
</tr>
<tr>
<td>ii. Isolate</td>
<td></td>
</tr>
<tr>
<td>iii. Barricade</td>
<td></td>
</tr>
<tr>
<td>2. Need for additional resources</td>
<td></td>
</tr>
<tr>
<td>a. Incident Command/Management System (&quot;ICS&quot; or &quot;IMS&quot;)</td>
<td></td>
</tr>
<tr>
<td>b. Consider if this level of commitment is required</td>
<td></td>
</tr>
</tbody>
</table>

#### P 9.1.2.7 – Coordinate scene safety.

|   | N/A |
9.2 – Primary Assessment

<table>
<thead>
<tr>
<th>Objective</th>
<th>Educational Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>9.2.1 – Primary Survey/Primary Assessment</strong></td>
<td><strong>C 9.2.1.1 – List the criteria to be evaluated during the primary survey/assessment of a patient.</strong></td>
</tr>
</tbody>
</table>
| | 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 fast (>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**
| 9.2.1.3 – Demonstrate appropriate primary survey/assessment of a patient. | N/A |
| 9.2.1.4 – Formulate field impression(s). | N/A |
| 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 |

9.0 – Patient Assessment                  2011 WI Paramedic Curriculum
## 9.3 – History Taking

<table>
<thead>
<tr>
<th>Objective</th>
<th>Educational Standard</th>
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</thead>
<tbody>
<tr>
<td><strong>9.3.1 – Components of the Patient History</strong></td>
<td></td>
</tr>
</tbody>
</table>
| **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  
| **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

<table>
<thead>
<tr>
<th>C 9.3.2.3 – Discuss the purpose of direct questions and the techniques employed in asking direct questions.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. To gather additional information, direct questions may be required</td>
</tr>
<tr>
<td>2. Should not be leading questions</td>
</tr>
<tr>
<td>3. Ask one question at a time</td>
</tr>
<tr>
<td>4. Use language that is (age) appropriate</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>C 9.3.2.4 – Discuss considerations in obtaining a history pertaining to sensitive topics.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Alcohol and drugs</td>
</tr>
<tr>
<td>2. Physical abuse or violence</td>
</tr>
<tr>
<td>3. Sexual history</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>C 9.3.2.5 – Identify considerations pertaining to obtaining a history in trauma patients.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Focuses on general underlying health</td>
</tr>
<tr>
<td>a. Special emphasis on conditions contributing to morbidity and mortality in trauma</td>
</tr>
<tr>
<td>b. Current medications</td>
</tr>
<tr>
<td>c. Allergies</td>
</tr>
<tr>
<td>2. Special attention on systems impacted by the traumatic event</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>9.3.3 – Components of the Patient History</th>
</tr>
</thead>
<tbody>
<tr>
<td>C 9.3.3.1 – Identify the components of a patient history.</td>
</tr>
<tr>
<td>1. Chief complaint</td>
</tr>
<tr>
<td>a. Brief statement of why the patient is seeking healthcare</td>
</tr>
<tr>
<td>b. Should include what is wrong and why</td>
</tr>
</tbody>
</table>
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. Dypsnea
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
### 9.0 – Patient Assessment  

| 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.*

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Silence</td>
</tr>
<tr>
<td>a.</td>
<td>Silence is often uncomfortable</td>
</tr>
<tr>
<td>b.</td>
<td>Silence has meaning and many uses</td>
</tr>
<tr>
<td></td>
<td>i. Patients may use this to collect their thoughts, remember details, or decide whether or not they trust the paramedic</td>
</tr>
<tr>
<td></td>
<td>ii. Be alert for nonverbal clues of distress</td>
</tr>
<tr>
<td>c.</td>
<td>Silence may be a result of the interviewer’s lack of sensitivity</td>
</tr>
<tr>
<td>2.</td>
<td>Overly talkative patients</td>
</tr>
<tr>
<td>a.</td>
<td>Faced with a limited amount of time, interviewers may become impatient</td>
</tr>
<tr>
<td>b.</td>
<td>Although there are no perfect solutions, several techniques may be helpful</td>
</tr>
<tr>
<td></td>
<td>i. Give the patient free reign for the first several minutes</td>
</tr>
<tr>
<td></td>
<td>ii. Summarize frequently</td>
</tr>
<tr>
<td>3.</td>
<td>Patients with multiple symptoms</td>
</tr>
<tr>
<td>4.</td>
<td>Anxious patients</td>
</tr>
<tr>
<td>a.</td>
<td>Anxiety is natural</td>
</tr>
<tr>
<td>b.</td>
<td>Be sensitive to nonverbal clues</td>
</tr>
<tr>
<td>5.</td>
<td>Reassurance</td>
</tr>
<tr>
<td>a.</td>
<td>It is tempting to be overly reassuring</td>
</tr>
<tr>
<td>b.</td>
<td>Premature reassurance blocks communication</td>
</tr>
<tr>
<td>6.</td>
<td>Anger and hostility</td>
</tr>
<tr>
<td>a.</td>
<td>Understand that anger and hostility are natural</td>
</tr>
<tr>
<td>b.</td>
<td>Do not become angry in return</td>
</tr>
<tr>
<td>7.</td>
<td>Intoxication</td>
</tr>
<tr>
<td>a.</td>
<td>Be accepting, not challenging</td>
</tr>
<tr>
<td>b.</td>
<td>Do not attempt to have the patient lower their voice or stop cursing; this may aggravate the patient</td>
</tr>
<tr>
<td>8.</td>
<td>Crying</td>
</tr>
<tr>
<td>a.</td>
<td>Crying, like anger and hostility, may provide valuable insight</td>
</tr>
<tr>
<td>b.</td>
<td>Be sympathetic</td>
</tr>
<tr>
<td>9.</td>
<td>Depression – Be alert for signs of depression</td>
</tr>
<tr>
<td>10.</td>
<td>Confusing behaviors or histories</td>
</tr>
<tr>
<td>a.</td>
<td>Be prepared for the confusion and frustration of varying behaviors and histories</td>
</tr>
<tr>
<td>b.</td>
<td>Be alert for mental illness, delirium, or dementia</td>
</tr>
<tr>
<td>11.</td>
<td>Limited intelligence</td>
</tr>
<tr>
<td>a.</td>
<td>Do not overlook the ability of these patients to provide the paramedic with adequate information</td>
</tr>
<tr>
<td>b.</td>
<td>Be alert for omissions</td>
</tr>
<tr>
<td>12.</td>
<td>Language barriers</td>
</tr>
<tr>
<td>a.</td>
<td>Take every possible step to find a translator</td>
</tr>
</tbody>
</table>
### 9.0 – Patient Assessment

#### 9.3 – History Taking

<table>
<thead>
<tr>
<th>9.3.6 – Integration of Therapeutic Communication, History Taking Techniques, Patient Presentation, and Assessment Findings (Development of Field Impression)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>C 9.3.6.1</strong> – 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.</td>
</tr>
<tr>
<td>N/A</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>9.3.7 – Treatment Plan (Modify Initial Treatment Plan)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>C 9.3.7.1</strong> – Summarize the “six Rs” of putting it all together to develop and implement a treatment plan based upon the field impression.</td>
</tr>
<tr>
<td>1. Read the patient</td>
</tr>
<tr>
<td>2. Read the scene</td>
</tr>
<tr>
<td>3. React</td>
</tr>
<tr>
<td>4. Reevaluation</td>
</tr>
<tr>
<td>5. Revise the management plan</td>
</tr>
<tr>
<td>6. Review performance</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>9.3.8 – Age-Related Considerations</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>C 9.3.8.1</strong> – Discuss considerations when obtaining a history for a pediatric patient.</td>
</tr>
<tr>
<td>1. History may be taken from parent or responsible adult</td>
</tr>
<tr>
<td>a. Every effort must be made to include the child</td>
</tr>
<tr>
<td>b. Explore the underlying fears that may not be expressed by the parents or child</td>
</tr>
<tr>
<td>c. Evaluate the relationship of the child to the caregiver</td>
</tr>
<tr>
<td>2. Present problem or illness</td>
</tr>
<tr>
<td>3. Past medical history</td>
</tr>
<tr>
<td>a. General health evaluation varies dependent on the child’s age</td>
</tr>
<tr>
<td>i. Neonates and infants</td>
</tr>
<tr>
<td>1. Maternal health during pregnancy</td>
</tr>
<tr>
<td>a. Specific maternal</td>
</tr>
<tr>
<td>b. Medications, hormones, vitamins</td>
</tr>
<tr>
<td>c. Drug use</td>
</tr>
</tbody>
</table>
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
<p>| | |</p>
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<tbody>
<tr>
<td>c.</td>
<td>Instrumental activities of daily living (“IADL”)</td>
</tr>
<tr>
<td>d.</td>
<td>Activities of daily living</td>
</tr>
</tbody>
</table>
9.4 – Secondary Assessment

<table>
<thead>
<tr>
<th>Objective</th>
<th>Educational Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>9.4.1 – Techniques of Physical Examination</strong></td>
<td></td>
</tr>
<tr>
<td>C 9.4.1.1 – List major body systems.</td>
<td>N/A</td>
</tr>
<tr>
<td>C 9.4.1.2 – List major anatomical regions.</td>
<td>N/A</td>
</tr>
<tr>
<td><strong>9.4.2 – Physical Examination</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Techniques Will Vary from Patient to Patient Depending on the Chief Complaint, Present Illness, and History</strong></td>
<td></td>
</tr>
<tr>
<td>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.</td>
<td>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.</td>
</tr>
<tr>
<td><strong>9.4.3 – Physical Examination (Approach and Overview)</strong></td>
<td></td>
</tr>
<tr>
<td>C 9.4.3.2 – Discuss the general approach to be taken in conducting a physical examination of a patient.</td>
<td>1. Examine the patient systematically 2. Examine the patient in the most appropriate environment available</td>
</tr>
</tbody>
</table>
### 9.4 – Mental Status

**C 9.4.1 – Describe the examination of a patient’s mental status.**

<p>| | |</p>
<table>
<thead>
<tr>
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</thead>
</table>
| 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 | 1. Mental status  
  2. General survey  
  3. Vital signs |

---

**C 9.4.3.3 – List the categories of a comprehensive physical examination.**

<p>| |</p>
<table>
<thead>
<tr>
<th></th>
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</thead>
</table>
| 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 |
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)

<table>
<thead>
<tr>
<th>9.4.5 – Techniques of Physical Exam: General Survey</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>C 9.4.5.1 – Discuss the techniques used in conducting a general survey physical examination.</strong></td>
</tr>
<tr>
<td>1. Introduction</td>
</tr>
<tr>
<td>a. Wide range of &quot;normal&quot;</td>
</tr>
<tr>
<td>b. Repetitive examination of multiple patients needed to establish one's own baseline knowledge</td>
</tr>
<tr>
<td>2. Physical findings in relation to development</td>
</tr>
<tr>
<td>a. Age</td>
</tr>
<tr>
<td>b. Sexual development</td>
</tr>
<tr>
<td>c. Weight</td>
</tr>
<tr>
<td>d. Height</td>
</tr>
<tr>
<td>3. Body structure</td>
</tr>
<tr>
<td>a. Symmetry</td>
</tr>
<tr>
<td>b. Body build</td>
</tr>
<tr>
<td>c. Physical fitness</td>
</tr>
<tr>
<td>d. Posture</td>
</tr>
<tr>
<td>4. Level of consciousness</td>
</tr>
<tr>
<td>a. AVPU</td>
</tr>
<tr>
<td>b. Level of orientation</td>
</tr>
<tr>
<td>5. Skin signs</td>
</tr>
<tr>
<td>a. Color</td>
</tr>
<tr>
<td>b. Temperature</td>
</tr>
<tr>
<td>c. Condition</td>
</tr>
<tr>
<td>d. Texture</td>
</tr>
<tr>
<td>e. Hydration</td>
</tr>
<tr>
<td>6. Age variation</td>
</tr>
<tr>
<td>a. Pediatric variation</td>
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<tr>
<td>b. Geriatric variation</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>9.4.6 – Vital Signs</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>C 9.4.6.1 – Identify vital signs commonly obtained during a physical examination.</strong></td>
</tr>
<tr>
<td>1. Introduction</td>
</tr>
<tr>
<td>a. Vital signs as baseline measurement of function</td>
</tr>
<tr>
<td>i. Respiration</td>
</tr>
<tr>
<td>ii. Circulation</td>
</tr>
<tr>
<td>iii. Perfusion</td>
</tr>
<tr>
<td>b. Position patient in normal position for accurate readings</td>
</tr>
<tr>
<td>2. Respiration</td>
</tr>
<tr>
<td>a. Respiratory rate</td>
</tr>
<tr>
<td>i. Visualize</td>
</tr>
<tr>
<td>ii. Expose as necessary</td>
</tr>
<tr>
<td>b. Respiratory depth</td>
</tr>
<tr>
<td>c. Respiratory effort</td>
</tr>
<tr>
<td>3. Circulation</td>
</tr>
<tr>
<td>a. Pulse rate</td>
</tr>
<tr>
<td>b. Pulse rhythm</td>
</tr>
<tr>
<td>i. Predictable</td>
</tr>
</tbody>
</table>
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
      ii. 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
### 9.0 – Patient Assessment

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<table>
<thead>
<tr>
<th>3. Head and neck</th>
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<tbody>
<tr>
<td>a. Review of anatomy and physiology</td>
</tr>
<tr>
<td>b. Review of related history</td>
</tr>
<tr>
<td>i. Present problem</td>
</tr>
<tr>
<td>ii. Past medical history</td>
</tr>
<tr>
<td>iii. Personal and social history</td>
</tr>
<tr>
<td>iv. Family history</td>
</tr>
<tr>
<td>c. Examination and findings</td>
</tr>
<tr>
<td>i. Head and face</td>
</tr>
<tr>
<td>1. Inspection</td>
</tr>
<tr>
<td>2. Palpation</td>
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<tr>
<td>ii. Neck</td>
</tr>
<tr>
<td>1. Inspection</td>
</tr>
<tr>
<td>2. Palpation</td>
</tr>
<tr>
<td>d. Infants and children</td>
</tr>
<tr>
<td>i. Findings related to birth and development</td>
</tr>
<tr>
<td>ii. Head control</td>
</tr>
<tr>
<td>iii. Symmetry</td>
</tr>
<tr>
<td>e. Common abnormalities</td>
</tr>
<tr>
<td>i. Adults</td>
</tr>
<tr>
<td>ii. Infants</td>
</tr>
<tr>
<td>f. Documentation terminology</td>
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</tbody>
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<tr>
<th>4. Eyes</th>
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<tbody>
<tr>
<td>a. Review of anatomy and physiology</td>
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<tr>
<td>b. Review of related history</td>
</tr>
<tr>
<td>i. Present problem</td>
</tr>
<tr>
<td>ii. Past medical history</td>
</tr>
<tr>
<td>iii. Personal and social history</td>
</tr>
<tr>
<td>iv. Family history</td>
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<tr>
<td>c. Examination and findings</td>
</tr>
<tr>
<td>i. Visual acuity</td>
</tr>
<tr>
<td>ii. External examination</td>
</tr>
<tr>
<td>iii. Extraocular muscles</td>
</tr>
<tr>
<td>iv. Ophthalmoscopic examination</td>
</tr>
<tr>
<td>d. Common abnormalities</td>
</tr>
<tr>
<td>e. Infants and children</td>
</tr>
<tr>
<td>i. Ethnic variation</td>
</tr>
<tr>
<td>ii. Newborn variations</td>
</tr>
<tr>
<td>iii. Congenital changes</td>
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</tbody>
</table>

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<thead>
<tr>
<th>5. Ear, nose, throat, and neck</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Review of anatomy and physiology</td>
</tr>
<tr>
<td>b. Review of related history</td>
</tr>
</tbody>
</table>
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
### 9.0 – Patient Assessment

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<th>9.4 – Secondary Assessment</th>
<th>2011 WI Paramedic Curriculum</th>
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<tr>
<td>a.</td>
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<tr>
<td>Female – See Special Populations, Obstetrical and Medical Emergencies, and Gynecological</td>
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<td>b.</td>
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<tr>
<td>Male</td>
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<tr>
<td>i. Review of anatomy and physiology</td>
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<td>ii. Review of related history</td>
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<tr>
<td>1. Present problem</td>
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<td>2. Past medical history</td>
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<td>3. Personal and social history</td>
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<td>iii. Examination and findings</td>
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<tr>
<td>1. Inspection and palpation</td>
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<td>2. Lesions</td>
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<td>3. Priapism</td>
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<td>4. Hernia</td>
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<td>iv. Common abnormalities</td>
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<td>v. Documentation terminology</td>
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<tr>
<td>10. Anus, rectum</td>
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<tr>
<td>a. Review of anatomy and physiology</td>
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<td>iv. Family history</td>
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<td>c. Examination and findings</td>
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<td>iii. Range of motion</td>
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<td>iv. Muscle strength</td>
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<td>v. Specific joint assessment</td>
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<td>d. Common abnormalities</td>
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<td>e. Documentation terminology</td>
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<td>11. Musculoskeletal system</td>
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<td>a. Review of anatomy and physiology</td>
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<td>b. Review of related history</td>
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<td>i. Past problem</td>
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<td>iv. Muscle strength</td>
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<td>v. Specific joint assessment</td>
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<td>d. Specific landmarks in child development</td>
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<td>e. Older patients</td>
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<tr>
<td>i. Mobility changes</td>
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<td>ii. Joint and muscle changes</td>
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<td>iii. Muscle mass reduction</td>
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<td>f. Common abnormalities</td>
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<td>12. Neurological system</td>
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<tr>
<td>a. Review of anatomy and physiology</td>
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<td>c. Examination and findings</td>
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<tr>
<td>i. Cognitive abilities</td>
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<td>ii. Cranial nerve assessment</td>
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<td>iii. Proprioception and cerebellar function</td>
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<tr>
<td>1. Coordination and fine motor skills</td>
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<td>2. Balance</td>
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</tbody>
</table>
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

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<thead>
<tr>
<th>Objective</th>
<th>Educational Standard</th>
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</thead>
<tbody>
<tr>
<td><strong>9.5.1 – Continuous ECG Monitoring</strong></td>
<td>C 9.5.1.1 – Discuss the purpose, indications, procedures, and limitations of continuous ECG monitoring.</td>
</tr>
<tr>
<td>1. Purpose</td>
<td></td>
</tr>
</tbody>
</table>
| 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")

<table>
<thead>
<tr>
<th>9.5.5 – Other Monitoring Devices</th>
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</thead>
<tbody>
<tr>
<td><strong>C 9.5.5.1 – Discuss other monitoring devices available for use at the paramedic level.</strong></td>
</tr>
<tr>
<td>As additional monitoring devices become recognized as the &quot;standard of care&quot; 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.</td>
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<tr>
<td>State regulatory processes may elect to expand, delete, or modify from the monitor devices in this section.</td>
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</table>
### 9.6 – Reassessment

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<tr>
<th>Objective</th>
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<tbody>
<tr>
<td><strong>9.6.1 – How and When to Reassess</strong></td>
<td>N/A</td>
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<tr>
<td>C 9.6.1.1 – Discuss how and when to reassess a patient.</td>
<td></td>
</tr>
<tr>
<td><strong>9.6.2 – Patient Evaluation: Reassessment</strong></td>
<td></td>
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</tbody>
</table>
| 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** | N/A |
| C 9.6.2.2 – Discuss the need to document reassessment findings. | |
| **9.6.4 – Age-Related Considerations** | 1. Pediatrics  
2. Geriatrics |
| C 9.6.4.1 – Identify age-related considerations for reassessing pediatric and geriatric patients. | |
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**

<table>
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<tr>
<td><strong>10.1.1 – Assessment Factors</strong></td>
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<tr>
<td><strong>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.</strong></td>
</tr>
<tr>
<td>1. Scene safety</td>
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<tr>
<td>2. Environment</td>
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<tr>
<td>3. Chief complaint</td>
</tr>
<tr>
<td>a. Primary reason for EMS response</td>
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<tr>
<td>b. Verbal or non-verbal</td>
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<tr>
<td>c. Possibly misleading</td>
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<tr>
<td>4. Life threatening conditions</td>
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<tr>
<td>5. Non-life threatening conditions</td>
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<tr>
<td>6. Distracting injuries</td>
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<tr>
<td>7. Tunnel vision</td>
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<tr>
<td>8. Patient cooperation</td>
</tr>
<tr>
<td>9. EMT attitude</td>
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</tbody>
</table>

| **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. Focusses 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. Focusses 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. Focusses 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. Focusses on the specific area of the pain/discomfort
      2. Question(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. Focusses 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. Focusses 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.**

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<tr>
<td>1.</td>
<td>Formation of differential diagnosis</td>
</tr>
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<td>a.</td>
<td>Integration of history and physical assessment findings</td>
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<td>b.</td>
<td>Past experience</td>
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<tr>
<td>c.</td>
<td>“Gut instinct”</td>
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<td>2.</td>
<td>Differentiation of the underlying cause of the patient’s condition from other possible causes</td>
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<td>3.</td>
<td>Patient presentation often leads to a recognizable pattern common to multiple conditions with similar presentations</td>
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<td>4.</td>
<td>Assess for clues to determine minor differences in patient presentation</td>
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<td>5.</td>
<td>Determine field differential diagnosis based on available information</td>
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<tr>
<td>6.</td>
<td>Realize the differential diagnosis may change as the patient condition changes or additional information becomes available</td>
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### 10.2 – Neurology

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<td><em>C 10.2.1.1 – Discuss the morbidity/mortality, preventative strategies, and pathophysiology of neurological conditions.</em></td>
<td>1. Epidemiology  2. Pathophysiology</td>
</tr>
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<td><strong>10.2.2 – Central Nervous System</strong></td>
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<tr>
<td><em>C 10.2.2.1 – Discuss the anatomy and physiology of the nervous system.</em></td>
<td>1. Brain  2. Spinal cord  3. Autonomic and peripheral nervous system</td>
</tr>
<tr>
<td><strong>10.2.3 – Neurological Assessment (Normal and Abnormal Findings)</strong></td>
<td></td>
</tr>
<tr>
<td><strong>10.2.4 – General Management Considerations</strong></td>
<td></td>
</tr>
<tr>
<td><em>C 10.2.4.1 – Discuss general management conditions for patients with a neurological emergency.</em></td>
<td>1. Airway, ventilation, respiration, and circulation  2. Emotional support  3. Transport decisions</td>
</tr>
<tr>
<td><strong>10.2.5 – Neurological Conditions</strong></td>
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</tbody>
</table>
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. Creutzfeldt-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
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<th>10.2.6 – Age-Related Variations</th>
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<td><strong>C 10.2.6.1</strong> – Identify differences in neurological emergencies affecting pediatric and geriatric patients.</td>
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<td><strong>a.</strong> Epidemiology</td>
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<td><strong>b.</strong> Anatomic and physiologic differences in children</td>
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<td><strong>c.</strong> Pathophysiology</td>
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<td><strong>d.</strong> Causes of altered mental status in children</td>
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<td><strong>e.</strong> Assessment</td>
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<td><strong>i.</strong> History</td>
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<td><strong>ii.</strong> Physical findings</td>
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<td><strong>f.</strong> Meningitis</td>
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<td><strong>g.</strong> Febrile seizures</td>
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<td><strong>h.</strong> Altered mental status</td>
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<td><strong>i.</strong> Ventricular shunts</td>
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<td><strong>ii.</strong> Infection</td>
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<td><strong>iii.</strong> Malfunction</td>
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<td><strong>j.</strong> Management</td>
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<tr>
<td>2. Geriatrics – Stroke risk high in this age group</td>
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<th>10.2.7 – Communication and Documentation</th>
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<td><strong>C 10.2.7.1</strong> – Discuss communication and documentation considerations for patients with neurological emergencies.</td>
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<tr>
<th>10.2.8 – Transport Decisions</th>
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</thead>
<tbody>
<tr>
<td><strong>C 10.2.8.1</strong> – Discuss transport considerations for patients with neurological emergencies.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>10.2.9 – Patient Education and Prevention of Complications or Future Neurological Emergencies</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>C 10.2.9.1</strong> – Discuss patient education and prevention of complications or future neurological emergencies.</td>
</tr>
</tbody>
</table>
### Objective – Abdominal and Gastrointestinal Disorders

<table>
<thead>
<tr>
<th>Objective</th>
<th>Educational Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>10.3.1 – Introduction</td>
<td></td>
</tr>
</tbody>
</table>
| 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  
ii. Constipation  
   j. Diarrhea  
k. Weight loss  
l. Last meal  
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 |
### 10.3 – Abdominal and Gastrointestinal Disorders

#### 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.**

<table>
<thead>
<tr>
<th>1. Upper gastrointestinal bleeding</th>
<th>a. Ulcerative diseases</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>i. Peptic ulcer disease</td>
</tr>
<tr>
<td></td>
<td>ii. Pathophysiology</td>
</tr>
<tr>
<td></td>
<td>iii. Patient history</td>
</tr>
<tr>
<td></td>
<td>iv. Erosive gastritis</td>
</tr>
<tr>
<td>b. Esophagogastric varices</td>
<td></td>
</tr>
<tr>
<td>c. Other causes</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>2. Lower gastrointestinal bleeding – Common causes</th>
<th>a. Non-life threatening</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>i. Hemorrhoids</td>
</tr>
<tr>
<td></td>
<td>1. Presentation</td>
</tr>
<tr>
<td></td>
<td>2. Prehospital implications</td>
</tr>
<tr>
<td></td>
<td>ii. Anal fissures</td>
</tr>
<tr>
<td></td>
<td>iii. Other</td>
</tr>
<tr>
<td>b. Potentially life-threatening</td>
<td></td>
</tr>
<tr>
<td>i. Diverticulitis</td>
<td></td>
</tr>
<tr>
<td>ii. Other</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>3. Liver diseases</th>
<th>a. Hepatitis (see Infectious Disease)</th>
</tr>
</thead>
<tbody>
<tr>
<td>b. Cirrhosis</td>
<td></td>
</tr>
<tr>
<td>i. Pathophysiology</td>
<td></td>
</tr>
<tr>
<td>ii. Signs and symptoms</td>
<td></td>
</tr>
<tr>
<td>iii. Prehospital implications</td>
<td></td>
</tr>
<tr>
<td>c. Hepatic encephalopathy</td>
<td></td>
</tr>
<tr>
<td>i. Pathophysiology</td>
<td></td>
</tr>
<tr>
<td>ii. Signs and symptoms</td>
<td></td>
</tr>
<tr>
<td>iii. Prehospital implications</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>4. Infectious Disorders</th>
<th>a. Pathophysiology</th>
</tr>
</thead>
<tbody>
<tr>
<td>b. Signs and symptoms</td>
<td></td>
</tr>
<tr>
<td>i. Fever</td>
<td></td>
</tr>
<tr>
<td>ii. Ascites</td>
<td></td>
</tr>
<tr>
<td>iii. Abdominal pain characteristics</td>
<td></td>
</tr>
<tr>
<td>iv. Hemodynamic instability</td>
<td></td>
</tr>
<tr>
<td>v. Pharmacologic and non-pharmacologic interventions</td>
<td></td>
</tr>
<tr>
<td>c. Peritonitis</td>
<td></td>
</tr>
<tr>
<td>d. Gastroenteritis</td>
<td></td>
</tr>
<tr>
<td>i. Causative organisms</td>
<td></td>
</tr>
<tr>
<td>1. Rotavirus, Norwalk virus, and many others</td>
<td></td>
</tr>
<tr>
<td>2. Parasites</td>
<td></td>
</tr>
</tbody>
</table>
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
<table>
<thead>
<tr>
<th>Section</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>10.3.5 – Communication and Documentation</strong></td>
<td></td>
</tr>
<tr>
<td>C 10.3.5.1 - Discuss communication and documentation considerations for patients with abdominal and gastrointestinal emergencies.</td>
<td>N/A</td>
</tr>
<tr>
<td><strong>10.3.6 – Transport Decisions</strong></td>
<td></td>
</tr>
<tr>
<td>C 10.3.6.1 - Discuss transport considerations for patients with abdominal and gastrointestinal emergencies.</td>
<td>N/A</td>
</tr>
<tr>
<td><strong>10.3.7 – Patient Education and Prevention</strong></td>
<td></td>
</tr>
<tr>
<td>C 10.3.7.1 - Discuss patient education and prevention of complications or future abdominal or gastrointestinal emergencies</td>
<td>N/A</td>
</tr>
</tbody>
</table>

- a. AAA more common
- b. May not exhibit rigidity or guarding
- c. Abdominal pain related to cardiac conditions
### 10.4 – Immunology

#### Objective – Introduction

<table>
<thead>
<tr>
<th>Objective</th>
<th>Educational Standard</th>
</tr>
</thead>
</table>
| 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

<table>
<thead>
<tr>
<th>Objective</th>
<th>Educational Standard</th>
</tr>
</thead>
</table>
| 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

<table>
<thead>
<tr>
<th>Objective</th>
<th>Educational Standard</th>
</tr>
</thead>
</table>
| 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

<table>
<thead>
<tr>
<th>Objective</th>
<th>Educational Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>C 10.4.4.1 – Describe the anaphylactoid reaction process.</td>
<td>N/A</td>
</tr>
</tbody>
</table>

#### 10.4.5 – Managing an Allergic Reaction

<table>
<thead>
<tr>
<th>Objective</th>
<th>Educational Standard</th>
</tr>
</thead>
</table>
| 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.

<table>
<thead>
<tr>
<th>10.4.11 – Patient Education and Prevention</th>
</tr>
</thead>
<tbody>
<tr>
<td>C 10.4.11.1 - Discuss patient education and prevention of complications or future immunology emergencies.</td>
</tr>
</tbody>
</table>
## 10.5 – Infectious Diseases

<table>
<thead>
<tr>
<th>Objective</th>
<th>Educational Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>10.5.1 – Public Health Principles and Agencies Responsible for Public Health</strong></td>
<td></td>
</tr>
<tr>
<td><strong>C 10.5.1.1 – Discuss public health principles relevant to infectious/communicable diseases.</strong></td>
<td>1. Demographic 2. Epidemiology diseases a. Endemic b. Epidemic c. Pandemic</td>
</tr>
<tr>
<td><strong>C 10.5.1.2 – Identify public health agencies involved in the prevention and management of disease outbreaks.</strong></td>
<td>N/A</td>
</tr>
<tr>
<td><strong>10.5.2 – Pathophysiology of Infectious Disease</strong></td>
<td></td>
</tr>
<tr>
<td><strong>10.5.3 – Standard Precautions, Personal Protective Equipment, and Cleaning and Disposing of Equipment and Supplies</strong></td>
<td></td>
</tr>
<tr>
<td><strong>C 10.5.3.1 – Discuss techniques employed by paramedics to limit or prevent the spread of</strong></td>
<td>1. Principles of standard precautions 2. Current hand washing guidelines</td>
</tr>
</tbody>
</table>
### 10.0 – Medicine

<table>
<thead>
<tr>
<th>10.5 – Infectious Diseases</th>
</tr>
</thead>
</table>

**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**

<table>
<thead>
<tr>
<th>1. HIV and AIDS</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Incidence, morbidity, mortality, risk factors, and modes of transmission</td>
</tr>
<tr>
<td>b. Pathophysiology</td>
</tr>
<tr>
<td>c. Body systems affected</td>
</tr>
<tr>
<td>d. Progression of disease, including opportunistic infections</td>
</tr>
<tr>
<td>e. Healthcare worker susceptibility and transmission</td>
</tr>
<tr>
<td>f. Assessment findings and symptoms</td>
</tr>
<tr>
<td>i. Often asymptomatic</td>
</tr>
<tr>
<td>ii. Non-specific febrile illness</td>
</tr>
<tr>
<td>iii. Sore throat, fatigue</td>
</tr>
<tr>
<td>iv. Swollen spleen and lymph glands</td>
</tr>
<tr>
<td>v. Weight loss</td>
</tr>
<tr>
<td>vi. Opportunistic infections</td>
</tr>
<tr>
<td>g. Management for a patient with HIV or AIDS-related conditions</td>
</tr>
<tr>
<td>i. Prehospital care is supportive</td>
</tr>
<tr>
<td>ii. Manage airway and support ventilation</td>
</tr>
<tr>
<td>iii. IV if needed</td>
</tr>
<tr>
<td>iv. Respiratory isolation if coughing</td>
</tr>
<tr>
<td>h. Immunization and treatment of exposure</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>2. Hepatitis</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Pathophysiology, incidence, types, causes, risk factors, methods of transmission, and complications</td>
</tr>
<tr>
<td>b. General assessment findings and symptoms</td>
</tr>
<tr>
<td>i. Asymptomatic</td>
</tr>
<tr>
<td>ii. Non-specific febrile illness</td>
</tr>
<tr>
<td>iii. Light-colored stools</td>
</tr>
<tr>
<td>iv. Dark urine</td>
</tr>
<tr>
<td>v. Fatigue</td>
</tr>
<tr>
<td>vi. Nausea/vomiting</td>
</tr>
<tr>
<td>vii. Abdominal pain/tenderness</td>
</tr>
<tr>
<td>viii. Jaundice</td>
</tr>
<tr>
<td>ix. Fulminant acute hepatitis</td>
</tr>
<tr>
<td>c. Treatments for exposure/prevention; immunizations</td>
</tr>
<tr>
<td>d. Types</td>
</tr>
<tr>
<td>i. Hepatitis A</td>
</tr>
<tr>
<td>ii. Hepatitis B</td>
</tr>
</tbody>
</table>
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 – Conjunctivitis, 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 – Methicillin 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 nervous 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 corporis (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. Conjunctivitis 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

| 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

| 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

| 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

<table>
<thead>
<tr>
<th><strong>Objective</strong></th>
<th><strong>Educational Standard</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>10.6.1 – Overview of Endocrine Conditions</strong></td>
<td></td>
</tr>
</tbody>
</table>
| **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 |
### 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 10.7.1 – Introduction

<table>
<thead>
<tr>
<th>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.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Education Standard</td>
</tr>
<tr>
<td>1. Prevalence</td>
</tr>
<tr>
<td>2. Medical legal considerations</td>
</tr>
<tr>
<td>3. Safety</td>
</tr>
</tbody>
</table>

### Objective 10.7.2 – Pathophysiology

<table>
<thead>
<tr>
<th>C 10.7.2.1 – Discuss the pathophysiology of behavioral and psychiatric disorders.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Education Standard</td>
</tr>
<tr>
<td>1. Biological/organic</td>
</tr>
<tr>
<td>2. Environment</td>
</tr>
<tr>
<td>a. Psychosocial</td>
</tr>
<tr>
<td>b. Socio-cultural</td>
</tr>
<tr>
<td>3. Injury and illness</td>
</tr>
<tr>
<td>4. Substance-related</td>
</tr>
<tr>
<td>a. Abuse</td>
</tr>
<tr>
<td>b. Dependence</td>
</tr>
<tr>
<td>c. Intoxication</td>
</tr>
<tr>
<td>d. Medication non-compliance</td>
</tr>
</tbody>
</table>

### Objective 10.7.3 – Understanding Behavior

<table>
<thead>
<tr>
<th>C 10.7.3.1 – Define different types of behavior.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Education Standard</td>
</tr>
<tr>
<td>1. Normal</td>
</tr>
<tr>
<td>2. Abnormal</td>
</tr>
<tr>
<td>3. Overt</td>
</tr>
<tr>
<td>4. Violent</td>
</tr>
</tbody>
</table>

### Objective 10.7.4 – Acute Psychosis

<table>
<thead>
<tr>
<th>C 10.7.4.1 – Discuss the pathophysiology, signs and symptoms, and prehospital management of acute psychosis.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Education Standard</td>
</tr>
<tr>
<td>1. Pathophysiology</td>
</tr>
<tr>
<td>a. Related to mental illness</td>
</tr>
<tr>
<td>b. Organic psychosis</td>
</tr>
<tr>
<td>2. Signs and symptoms</td>
</tr>
<tr>
<td>3. Prehospital management</td>
</tr>
<tr>
<td>a. Non-pharmacologic</td>
</tr>
<tr>
<td>b. Pharmacologic</td>
</tr>
</tbody>
</table>

### Objective 10.7.5 – Agitated Delirium

<table>
<thead>
<tr>
<th>C 10.7.5.1 – Discuss the pathophysiology, risk factors, signs and symptoms, and management of agitated delirium.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Education Standard</td>
</tr>
<tr>
<td>1. Pathophysiology</td>
</tr>
<tr>
<td>2. Risk factors</td>
</tr>
<tr>
<td>3. Signs and symptoms</td>
</tr>
<tr>
<td>4. Management</td>
</tr>
</tbody>
</table>

### Objective 10.7.6 – Specific Behavioral/Psychiatric Disorders

<table>
<thead>
<tr>
<th>C 10.7.6.1 – Differentiate between different behavioral/psychiatric disorders.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Education Standard</td>
</tr>
<tr>
<td>1. Cognitive disorders</td>
</tr>
<tr>
<td>2. Thought disorders</td>
</tr>
<tr>
<td>a. Schizophrenia</td>
</tr>
<tr>
<td>b. Psychosis</td>
</tr>
<tr>
<td>3. Mood disorders</td>
</tr>
<tr>
<td>a. Bipolar</td>
</tr>
<tr>
<td>b. Depression</td>
</tr>
<tr>
<td>4. Neurotic disorders</td>
</tr>
<tr>
<td>5. Substance-related disorders/addictive behavior</td>
</tr>
<tr>
<td>6. Somatoform disorders</td>
</tr>
</tbody>
</table>
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

<table>
<thead>
<tr>
<th>Objective</th>
<th>Educational Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>10.8.1 – Anatomy of the Cardiovascular System</strong></td>
<td></td>
</tr>
</tbody>
</table>
| 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. Atrioventricular (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 (S₁)
   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 (S₂)
      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 systemic blood vessels

3. Autonomic nervous system relationship to cardiovascular system
   a. Medulla
   b. Carotid sinus and baroreceptor
      i. Location
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.

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Chief complaint</td>
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<tr>
<td>2.</td>
<td>Pain</td>
</tr>
<tr>
<td>a.</td>
<td>OPQRST</td>
</tr>
<tr>
<td>i.</td>
<td>O – Onset/Origin</td>
</tr>
<tr>
<td></td>
<td>1. Pertinent past history</td>
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<td></td>
<td>2. Tim of onset</td>
</tr>
<tr>
<td>ii.</td>
<td>P – Provocation</td>
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<tr>
<td></td>
<td>1. Exertional</td>
</tr>
<tr>
<td></td>
<td>2. Non-exertional</td>
</tr>
<tr>
<td>iii.</td>
<td>Q – Quality</td>
</tr>
<tr>
<td>iv.</td>
<td>R – Region/Radiation</td>
</tr>
<tr>
<td>v.</td>
<td>S – Severity</td>
</tr>
<tr>
<td>vi.</td>
<td>T – Timing</td>
</tr>
<tr>
<td></td>
<td>1. Duration</td>
</tr>
<tr>
<td></td>
<td>2. Worsening or improving</td>
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<td></td>
<td>3. Continuous or intermittent</td>
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<td></td>
<td>4. At rest or with activity</td>
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<tr>
<td>3.</td>
<td>Dyspnea</td>
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<tr>
<td>a.</td>
<td>Continuous or intermittent</td>
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<tr>
<td>b.</td>
<td>Exertional</td>
</tr>
<tr>
<td>c.</td>
<td>Non-exertional</td>
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<tr>
<td>d.</td>
<td>Orthopneic</td>
</tr>
<tr>
<td>4.</td>
<td>Cough</td>
</tr>
<tr>
<td>a.</td>
<td>Dry</td>
</tr>
<tr>
<td>b.</td>
<td>Productive</td>
</tr>
<tr>
<td>5.</td>
<td>Related signs and symptoms</td>
</tr>
<tr>
<td>a.</td>
<td>Level of consciousness</td>
</tr>
<tr>
<td>b.</td>
<td>Diaphoresis</td>
</tr>
<tr>
<td>c.</td>
<td>Restlessness, anxiety</td>
</tr>
<tr>
<td>d.</td>
<td>Feeling of impending doom</td>
</tr>
<tr>
<td>e.</td>
<td>Nausea/vomiting</td>
</tr>
<tr>
<td>f.</td>
<td>Fatigue</td>
</tr>
<tr>
<td>g.</td>
<td>Palpitations</td>
</tr>
<tr>
<td>h.</td>
<td>Edema</td>
</tr>
</tbody>
</table>
### 10.0 – Medicine

#### 2011 WI Paramedic Curriculum

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### 10.8.7 – Secondary Survey for Cardiovascular Assessment

**C 10.8.7.1** - Discuss the secondary survey as applied to a cardiovascular assessment.

<table>
<thead>
<tr>
<th>1. Inspection</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Tracheal position</td>
</tr>
<tr>
<td>b. Neck veins</td>
</tr>
<tr>
<td>i. Appearance</td>
</tr>
<tr>
<td>ii. Pressure</td>
</tr>
<tr>
<td>iii. Clinical significance</td>
</tr>
<tr>
<td>c. Thorax</td>
</tr>
<tr>
<td>i. Configuration</td>
</tr>
</tbody>
</table>

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<td>iii. Clinical significance</td>
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<tr>
<td>c. Thorax</td>
</tr>
<tr>
<td>i. Configuration</td>
</tr>
</tbody>
</table>

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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 S1, S2
      iii. Identify abnormal sounds (S3, S4)

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 |
### 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 ischemia

### 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  

<table>
<thead>
<tr>
<th>P 10.8.8.7 – Identify cardiac arrhythmias.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Arrhythmia originating in the sinus node</td>
</tr>
</tbody>
</table>
| 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 rhythm  
| 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 – V₁ positive
            a. Biphasic lead I with a broad terminal S wave
            b. Triphasic QRS in V₄
         3. LBBB aberration – V₁ negative
            a. Monophasic notched lead I
            b. Slurred, notched, or RSr’ in lead V₄, V₅, or V₆
         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. Cardiopulmonary resuscitation if cardiac arrest is present
b. Cardiopulmonary resuscitation if cardiac arrest is not present

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. Alkalizing agents
11. Cardiac glycoside
12. Narcotic/analgesic
13. Diuretic
14. Nitrate
15. Antihypertensive

<table>
<thead>
<tr>
<th>10.8.9.3 – Discuss electrical interventions available for the treatment of cardiac arrhythmias.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1. Purpose</strong></td>
</tr>
<tr>
<td><strong>2. Methods</strong></td>
</tr>
<tr>
<td>a. Synchronized cardioversion</td>
</tr>
<tr>
<td>b. Defibrillation</td>
</tr>
<tr>
<td>c. Cardiac pacing</td>
</tr>
<tr>
<td>i. Implanted pacemaker functions</td>
</tr>
<tr>
<td>1. Characteristics</td>
</tr>
<tr>
<td>2. Pacemaker artifact</td>
</tr>
<tr>
<td>3. ECG tracing of capture</td>
</tr>
<tr>
<td>4. Failure to sense</td>
</tr>
<tr>
<td>a. ECG indications</td>
</tr>
<tr>
<td>b. Clinical significance</td>
</tr>
<tr>
<td>5. Failure to capture</td>
</tr>
<tr>
<td>a. ECG indications</td>
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<tr>
<td>b. Clinical significance</td>
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<tr>
<td>6. Failure to pace</td>
</tr>
<tr>
<td>a. ECG indications</td>
</tr>
<tr>
<td>b. Clinical significance</td>
</tr>
<tr>
<td>7. Pacer-induced tachycardia</td>
</tr>
<tr>
<td>a. ECG findings</td>
</tr>
<tr>
<td>b. Clinical significance</td>
</tr>
<tr>
<td>c. Refer to ILCOR Consensus for treatment</td>
</tr>
<tr>
<td>ii. Transcutaneous pacing – Criteria for use</td>
</tr>
<tr>
<td>1. Bradycardia</td>
</tr>
<tr>
<td>a. Patient is hypotensive/hypoperfusing with CNS involvement</td>
</tr>
<tr>
<td>b. Refer to ILCOR Consensus for treatment</td>
</tr>
<tr>
<td>2. Second degree AV block</td>
</tr>
<tr>
<td>a. Patient is hypotensive/hypoperfusing with CNS involvement</td>
</tr>
<tr>
<td>b. Refer to ILCOR Consensus for treatment</td>
</tr>
<tr>
<td>3. Third degree AV block</td>
</tr>
<tr>
<td>a. Patient is hypotensive/hypoperfusing with CNS involvement</td>
</tr>
<tr>
<td>b. Refer to ILCOR Consensus for treatment</td>
</tr>
<tr>
<td>d. Setup</td>
</tr>
<tr>
<td>i. Placement of electrodes</td>
</tr>
<tr>
<td>ii. Rate and milliampere (mA) settings</td>
</tr>
<tr>
<td>iii. Pacer artifact</td>
</tr>
<tr>
<td>iv. Capture</td>
</tr>
<tr>
<td>v. Failure to sense</td>
</tr>
<tr>
<td>1. Causes</td>
</tr>
<tr>
<td>2. Implications</td>
</tr>
<tr>
<td>3. Interventions</td>
</tr>
<tr>
<td>vi. Failure to capture</td>
</tr>
<tr>
<td>1. Causes</td>
</tr>
<tr>
<td>2. Implications</td>
</tr>
</tbody>
</table>
| 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 |
| --- | --- |
| 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 |
| 10.8.9.5 – Apply electrical therapy. | 1. Cardioversion – electrical  
2. Defibrillation  
   a. Automated (AED)  
   b. Semi-automated (AED)  
   c. Manual  
3. Transcutaneous pacing |
| 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 | 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
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
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

<table>
<thead>
<tr>
<th>C 10.8.12.1</th>
<th>Discuss the precipitating causes, morbidity/mortality, pathophysiology, assessment findings, management, and communication strategies associated with heart failure.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Epidemiology</td>
</tr>
<tr>
<td>2.</td>
<td>Precipitating causes</td>
</tr>
<tr>
<td>a.</td>
<td>Left-sided failure</td>
</tr>
<tr>
<td>b.</td>
<td>Right-sided failure</td>
</tr>
<tr>
<td>c.</td>
<td>Myocardial infarction</td>
</tr>
<tr>
<td>d.</td>
<td>Pulmonary embolism</td>
</tr>
</tbody>
</table>
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


<table>
<thead>
<tr>
<th>10.8.15 – Cardiogenic Shock</th>
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</thead>
<tbody>
<tr>
<td><strong>C 10.8.15.1 - Discuss the precipitating causes, morbidity/mortality, pathophysiology, assessment findings, management, and communication strategies associated with cardiogenic shock.</strong></td>
</tr>
<tr>
<td>1. Pathophysiology</td>
</tr>
<tr>
<td>2. Precipitating causes</td>
</tr>
<tr>
<td>a. Myocardial infarction</td>
</tr>
<tr>
<td>b. Age</td>
</tr>
<tr>
<td>c. Trauma</td>
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<tr>
<td>3. Primary survey</td>
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<tr>
<td>a. Airway/breathing</td>
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<td>b. Circulation</td>
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<td>1. Quality</td>
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<td>2. Rhythm</td>
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<tr>
<td>ii. Peripheral perfusion</td>
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<tr>
<td>1. Changes in skin color</td>
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<tr>
<td>2. Changes in skin temperature</td>
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<td>3. Changes in skin moisture</td>
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<tr>
<td>4. History of the present illness/SAMPLE history (consider precipitating causes listed above)</td>
</tr>
<tr>
<td>a. Chief complaint</td>
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<td>b. Medication history</td>
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<tr>
<td>i. Prescribed</td>
</tr>
<tr>
<td>1. Compliance</td>
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<tr>
<td>2. Non-compliance</td>
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<td>ii. Borrowed</td>
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<tr>
<td>iii. Over-the-counter</td>
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<tr>
<td>iv. Home remedies</td>
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<tr>
<td>5. Secondary survey – Critical findings</td>
</tr>
<tr>
<td>a. Unconscious</td>
</tr>
<tr>
<td>b. Altered levels of consciousness</td>
</tr>
<tr>
<td>c. Airway</td>
</tr>
<tr>
<td>i. Dyspnea</td>
</tr>
<tr>
<td>ii. Productive cough</td>
</tr>
<tr>
<td>iii. Labored breathing</td>
</tr>
<tr>
<td>1. Paroxysmal nocturnal dyspnea (“PND”)</td>
</tr>
<tr>
<td>2. Tripod position</td>
</tr>
<tr>
<td>3. Adventitious sounds</td>
</tr>
<tr>
<td>4. Retraction</td>
</tr>
<tr>
<td>d. ECG rhythm analysis</td>
</tr>
<tr>
<td>i. Any tachycardia</td>
</tr>
<tr>
<td>ii. Atrial arrhythmias</td>
</tr>
<tr>
<td>iii. Ectopics</td>
</tr>
<tr>
<td>e. Changes in skin</td>
</tr>
<tr>
<td>i. Color</td>
</tr>
<tr>
<td>ii. Temperature</td>
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<tr>
<td>iii. Moisture</td>
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<tr>
<td>f. Peripheral pulses</td>
</tr>
<tr>
<td>i. Quality</td>
</tr>
<tr>
<td>ii. Rhythm</td>
</tr>
</tbody>
</table>
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
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
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 area 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


### 10.8.19 – Thromboembolism


### 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 |
### 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.

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. Appropriate 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

<table>
<thead>
<tr>
<th>Objective</th>
<th>Educational Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>10.9.1 – Epidemiology of Toxicology Emergencies</strong></td>
<td><strong>C 10.9.1.1 – Discuss the epidemiology of toxicology, including types of emergencies, pharmacokinetics, and routes of exposure.</strong></td>
</tr>
</tbody>
</table>
| | 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. 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. Ecstasy
      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
### 10.0 – Medicine

#### 10.9 – Toxicology

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<th>Section</th>
<th>Content</th>
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<tbody>
<tr>
<td><strong>10.9.3 – Alcoholism</strong></td>
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</table>

**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
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.

<table>
<thead>
<tr>
<th>1. Pesticides</th>
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<tbody>
<tr>
<td>a. Organophosphates</td>
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<tr>
<td>b. Carbamates</td>
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<tr>
<td>c. Warfarins</td>
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<tr>
<td>d. Pyrethrums (Raid)</td>
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<tr>
<td>2. Household cleaning poisonings</td>
</tr>
<tr>
<td>a. Bleach</td>
</tr>
<tr>
<td>b. Cleaning agents</td>
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<tr>
<td>c. Pine oil products</td>
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<tr>
<td>3. Poisonous plants</td>
</tr>
<tr>
<td>a. China berry</td>
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<tr>
<td>b. Foxglove</td>
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<tr>
<td>c. Mistletoe</td>
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<tr>
<td>d. Dieffenbachia</td>
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<tr>
<td>e. Others</td>
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</tbody>
</table>

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.

<table>
<thead>
<tr>
<th>1. Pathophysiology, incidence, toxic agents, risk factors, and complications</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. Medications</td>
</tr>
<tr>
<td>a. Cardiac medications</td>
</tr>
<tr>
<td>b. Psychiatric medications</td>
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<td>c. Non-prescription pain medications, including salicylates and acetaminophen</td>
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<td>d. Other</td>
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<tr>
<td>3. Assessment findings and symptoms for patients with a medication overdose</td>
</tr>
<tr>
<td>4. Management for a patient with a medication</td>
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</tbody>
</table>
### 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. Dimercapal
   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
### Objective 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
**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 cyanosis
   2. Clubbing
   3. 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
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
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<th>Section</th>
<th>Title</th>
<th>Details</th>
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<tr>
<td><strong>10.10.5</strong></td>
<td>Communication and Documentation for Patients with a Respiratory Condition or Emergency</td>
<td>C 10.10.5.1 – Discuss communication and documentation considerations for patients with respiratory emergencies/conditions. N/A</td>
</tr>
<tr>
<td><strong>10.10.6</strong></td>
<td>Transport Decisions</td>
<td>C 10.10.6.1 – Discuss transport considerations for patients with respiratory emergencies/conditions. N/A</td>
</tr>
<tr>
<td><strong>10.10.7</strong></td>
<td>Patient Education and Prevention of Complications or Future Respiratory Emergencies</td>
<td>C 10.10.7.1 – Discuss patient education and prevention of complications or future respiratory emergencies. N/A</td>
</tr>
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</table>
## 10.11 – Hematology

### Objective

#### 10.11.1 – Introduction

<table>
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<tr>
<th>Objective</th>
<th>Educational Standard</th>
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</table>
| 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

<table>
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<tr>
<th>Objective</th>
<th>Educational Standard</th>
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</table>
| 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

<table>
<thead>
<tr>
<th>Objective</th>
<th>Educational Standard</th>
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</table>
| C 10.11.3.1 – Discuss the general prehospital 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

<table>
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<tr>
<th>Objective</th>
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</table>
| 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 |
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. Homostatic 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

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<tr>
<th>Educational Standard</th>
<th>Description</th>
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<tbody>
<tr>
<td><strong>C 10.12.1.1</strong> – Describe the general anatomy and functions of the urinary system.</td>
<td>1. General anatomy&lt;br&gt;a. Structure of the kidneys, ureters, bladder, and urethra&lt;br&gt;b. Structure and function of the nephron</td>
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</tbody>
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#### 10.12.2 – Renal Diseases

<table>
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<th>Educational Standard</th>
<th>Description</th>
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</table>
| **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<br>a. Pathophysiology<br>i. Prerenal – Decreased blood flow to kidneys<br>ii. Intrarenal – Disease or damage within the kidneys<br>iii. Postrenal – Blockage to urine collecting system<br>b. Incidence, morbidity, and mortality<br>i. Acute renal failure
1. Definition
2. Causes<br>ii. Chronic renal failure
1. Definition
2. Causes<br>iii. End stage renal disease (“ESRD”)<br>2. Assessment findings and symptoms for renal failure<br>a. Acute renal failure
i. Reduced or no urinary output<br>ii. Excessive urinary output at night<br>iii. Lower extremity swelling<br>iv. Neuropathies of hands and feet<br>v. Anorexia<br>vi. Altered mental status<br>vii. Metallic taste in mouth<br>viii. Tremors or seizures<br>ix. Easy bruising or prolonged bleeding<br>x. Flank pain<br>xi. Tinnitus<br>xii. Hypertension<br>xiii. Abdominal pain or discomfort<br>b. Chronic renal failure
i. Headache<br>ii. Weakness<br>iii. Anorexia<br>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.*

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

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<th>Section</th>
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<td>10.12.5</td>
<td>Consider Age-Related Variations for Pediatric and Geriatric Patients</td>
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<tr>
<td>C 10.12.5.1</td>
<td>Identify differences in genitourinary/renal conditions or emergencies affecting pediatric and geriatric patients.</td>
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<td>10.12.6</td>
<td>Communication and Documentation</td>
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<tr>
<td>C 10.12.6.1</td>
<td>Discuss communication and documentation considerations for patients with genitourinary/renal conditions or emergencies.</td>
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<td>10.12.7</td>
<td>Transport Decisions</td>
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<td>C 10.12.7.1</td>
<td>Discuss transport considerations for patients with genitourinary/renal conditions or emergencies.</td>
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<td>10.12.8</td>
<td>Patient Education and Prevention</td>
</tr>
<tr>
<td>C 10.12.8.1</td>
<td>Discuss patient education and prevention of complications or future genitourinary/renal conditions or emergencies.</td>
</tr>
</tbody>
</table>
## 10.13 – Gynecology

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<tr>
<td><strong>10.13.1 – Introduction</strong></td>
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<tr>
<td>C 10.13.1.1 – Describe the female reproductive system anatomy.</td>
<td>1. External genitalia 2. Internal organs and structures</td>
</tr>
<tr>
<td><strong>10.13.2 – Physiology</strong></td>
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<tr>
<td><strong>10.13.3 – Symptoms and Assessment Findings</strong></td>
<td></td>
</tr>
<tr>
<td><strong>10.13.4 – General Management</strong></td>
<td></td>
</tr>
<tr>
<td>C 10.13.4.1 – Discuss the general management of a patient with a gynecological condition or emergency.</td>
<td>1. Protect privacy and modesty 2. Communication techniques 3. Consider pregnancy and/or sexually transmitted diseases 4. Oxygen and IV fluids if needed</td>
</tr>
<tr>
<td><strong>10.13.5 – Vaginal Bleeding</strong></td>
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<tr>
<td><strong>10.13.6 – Sexual Assault</strong></td>
<td></td>
</tr>
<tr>
<td><strong>10.13.7 – Infection (Including Pelvic Inflammatory Disease, Bartholoin’s Abscess, and Vaginitis/Vulvovaginitis)</strong></td>
<td></td>
</tr>
<tr>
<td>C 10.13.7.1 – Discuss the pathophysiology, assessment findings, and management of a female patient with a gynecological infection.</td>
<td>1. Pathophysiology 2. Assessment findings/presentation 3. Prehospital management</td>
</tr>
</tbody>
</table>
### 10.13.8 – Ovarian Cyst and Ruptured Ovarian Cyst

1. **Pathophysiology**
2. **Assessment findings/presentation**
3. **Prehospital management**

### 10.13.9 – Ovarian Torsion

1. **Pathophysiology**
2. **Assessment findings/presentation**
3. **Prehospital management**

### 10.13.10 – Endometriosis

1. **Pathophysiology**
2. **Assessment findings/presentation**
3. **Prehospital management**

### 10.13.11 – Dysfunctional Uterine Bleeding

1. **Pathophysiology**
2. **Assessment findings/presentation**
3. **Prehospital management**

### 10.13.12 – Prolapsed Uterus

1. **Pathophysiology**
2. **Assessment findings/presentation**
3. **Prehospital management**

### 10.13.13 – Vaginal Foreign Body

1. **Pathophysiology**
2. **Assessment findings/presentation**
3. **Prehospital management**

### 10.13.14 – Age-Related Variations

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
### Objective 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.)  |

### Objective 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  |

### Objective 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  |

### Objective 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, osteoarthritis] and slipped capital femoral epiphysis)  
| | a. Epidemiology  
| | b. Anatomy, physiology, and pathophysiology  
| | c. Assessment  
| | d. Prehospital management  
<p>| 4. Muscle abnormalities (myalgia/myositis, rhabdomyolysis)  |</p>
<table>
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<tr>
<th>10.14.5 – Consider Age-Related Variations in Pediatric and Geriatric Patients</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>C 10.14.5.1.</strong> – Identify differences in non-traumatic musculoskeletal conditions or emergencies affecting pediatric and geriatric patients.</td>
</tr>
<tr>
<td>1. Pediatric – Slipped femoral epiphysis juvenile arthritis</td>
</tr>
<tr>
<td>2. Geriatric - Osteoporosis</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>10.14.6 – Patient Education and Prevention</th>
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<tbody>
<tr>
<td><strong>C 10.14.6.1</strong> – Discuss patient education and prevention of complications or future non-traumatic musculoskeletal conditions or emergencies.</td>
</tr>
<tr>
<td>N/A</td>
</tr>
</tbody>
</table>
## 10.15 – Diseases of the Eyes, Ears, Nose, and Throat

### Objective

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<tbody>
<tr>
<td><strong>10.15.1 – Introduction</strong></td>
<td></td>
</tr>
</tbody>
</table>
| 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

<table>
<thead>
<tr>
<th>Objective</th>
<th>Educational Standard</th>
</tr>
</thead>
</table>
| 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

<table>
<thead>
<tr>
<th>Objective</th>
<th>Educational Standard</th>
</tr>
</thead>
</table>
| 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

<table>
<thead>
<tr>
<th>Objective</th>
<th>Educational Standard</th>
</tr>
</thead>
</table>
| 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. Epiglottitis  
v. Laryngitis  
vi. Tracheitis  
vii. Oral candidiasis  
viii. Perionsillar abscess  
ix. Pharyngitis/tonsillitis  
x. Temporomandibular joint disorders

<table>
<thead>
<tr>
<th>10.15.5 – Consider Age-Related Variations in Pediatric and Geriatric Patients</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>C 10.15.5.1 – Discuss differences in diseases affecting the eyes, ears, nose, and throat in pediatric patients.</strong></td>
</tr>
</tbody>
</table>
| 1. Foreign bodies of ears and nose common  
2. Ear infections common  
3. Epiglottis more common in children |

<table>
<thead>
<tr>
<th>10.15.6 – Patient Education and Prevention</th>
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<tbody>
<tr>
<td><strong>C 10.15.6.1 – Discuss patient education and prevention of complications or future diseases of the eyes, ears, nose, or throat.</strong></td>
</tr>
<tr>
<td>N/A</td>
</tr>
</tbody>
</table>

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

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<thead>
<tr>
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</tr>
</thead>
</table>
| 11.1.1 – 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 | 1. Healthy patient (adult)  
| | a. Coronary syndromes (conduction abnormalities, atherosclerosis)  
| | i. Modifiable risk factors  
| | ii. Non-modifiable risk factors  
| | b. Drowning  
| | c. Electrocuton  
| | 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 | N/A |

C 11.1.3.1 – Discuss the anatomy and physiology of the respiratory and
### 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 of 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
### 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
### 11.1.7.4 Discuss the delivery of effective chest compressions.

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<thead>
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<tbody>
<tr>
<td>1.</td>
<td>Factors that decrease effectiveness</td>
</tr>
<tr>
<td>a.</td>
<td>Compressions that are too shallow</td>
</tr>
<tr>
<td>b.</td>
<td>Slow compression rate</td>
</tr>
<tr>
<td>c.</td>
<td>Sub-maximum recoil</td>
</tr>
<tr>
<td>d.</td>
<td>Frequent interruptions</td>
</tr>
<tr>
<td>2.</td>
<td>Devices to assist circulation</td>
</tr>
<tr>
<td>a.</td>
<td>Active compression-decompression CPR</td>
</tr>
<tr>
<td>b.</td>
<td>Impedance threshold device</td>
</tr>
<tr>
<td>c.</td>
<td>Mechanical piston device</td>
</tr>
<tr>
<td>d.</td>
<td>Load-distributing band or vest CPR</td>
</tr>
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</table>

### 11.1.8 Automated External Defibrillation (Refer to Current AHA Guidelines)

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<tbody>
<tr>
<td>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).</td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>Adult sequence</td>
</tr>
<tr>
<td>2.</td>
<td>Child sequence</td>
</tr>
<tr>
<td>3.</td>
<td>Infant sequence</td>
</tr>
<tr>
<td>4.</td>
<td>Special situations</td>
</tr>
<tr>
<td>a.</td>
<td>Pacemaker/implanted cardioverter/defibrillator</td>
</tr>
<tr>
<td>b.</td>
<td>Wet victims</td>
</tr>
<tr>
<td>c.</td>
<td>Transdermal medication patches</td>
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</tbody>
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### 11.1.9 Advanced Life Support (Refer to Current AHA Guidelines)

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<tr>
<td>C 11.1.9.1 Describe ALS electrical therapies used in the treatment of cardiac arrest.</td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>Manual defibrillation</td>
</tr>
<tr>
<td>2.</td>
<td>Synchronized cardioversion</td>
</tr>
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<td>3.</td>
<td>Transcutaneous pacing</td>
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</table>

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<tr>
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</thead>
<tbody>
<tr>
<td>C 11.1.9.2 Describe ALS intravenous access as pertinent to treating cardiac arrest.</td>
<td></td>
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<tr>
<td>N/A</td>
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</table>

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<tr>
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<tbody>
<tr>
<td>C 11.1.9.3 List arrest cardiac rhythms.</td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>Ventricular fibrillation/pulseless ventricular tachycardia</td>
</tr>
<tr>
<td>2.</td>
<td>Pulseless electrical activity</td>
</tr>
<tr>
<td>3.</td>
<td>Asystole</td>
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<tbody>
<tr>
<td>C 11.1.9.4 List non-arrest cardiac rhythms.</td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>Bradycardia</td>
</tr>
<tr>
<td>2.</td>
<td>Tachycardia</td>
</tr>
</tbody>
</table>

### 11.1.10 Special Arrest and Peri-Arrest Situations (Refer to Current AHA Guidelines)

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<th>Level</th>
<th>Task</th>
</tr>
</thead>
<tbody>
<tr>
<td>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).</td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>Electrolyte abnormalities</td>
</tr>
<tr>
<td>a.</td>
<td>Epidemiology</td>
</tr>
<tr>
<td>b.</td>
<td>Pathophysiology</td>
</tr>
<tr>
<td>c.</td>
<td>Specific electrolytes</td>
</tr>
<tr>
<td>i.</td>
<td>Potassium</td>
</tr>
<tr>
<td>ii.</td>
<td>Sodium</td>
</tr>
</tbody>
</table>
11.1.11 – Postresuscitation Support
(Refer to the Current AHA Guidelines)

C 11.11.11 – Discuss postresuscitation support after the return of spontaneous circulation (“ROSC”). (Refer to current AHA guidelines.)

<p>| | |</p>
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<td>Temperature regulation (induced hypothermia)</td>
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<tr>
<td>2.</td>
<td>Glucose control</td>
</tr>
<tr>
<td>3.</td>
<td>Organ-specific support</td>
</tr>
<tr>
<td></td>
<td>a. Respiratory system</td>
</tr>
<tr>
<td></td>
<td>b. Cardiovascular system</td>
</tr>
<tr>
<td></td>
<td>c. Central nervous system</td>
</tr>
</tbody>
</table>

11.1.12 – Shock

C 11.11.12.1 – 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/glycolysis  
   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

<table>
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<th>C 11.1.12.6 – Discuss the stages of shock.</th>
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<tbody>
<tr>
<td>1. Compensated shock</td>
</tr>
<tr>
<td>2. Decompensated shock</td>
</tr>
<tr>
<td>3. Irreversible shock</td>
</tr>
</tbody>
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<tr>
<th>C 11.1.12.7 – Discuss specific types of shocks.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Hypovolemic</td>
</tr>
<tr>
<td>a. Hemorrhage classifications</td>
</tr>
</tbody>
</table>
   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                      |
### C 11.1.12.8 – Discuss complications associated with shock.

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Acute renal failure</td>
</tr>
<tr>
<td>2.</td>
<td>Acute adult respiratory distress syndrome (&quot;ARDS&quot;)</td>
</tr>
<tr>
<td>3.</td>
<td>Hematologic failure</td>
</tr>
<tr>
<td>4.</td>
<td>Hepatic failure</td>
</tr>
<tr>
<td>5.</td>
<td>Multiple organ dysfunction syndrome (&quot;MODS&quot;)</td>
</tr>
<tr>
<td></td>
<td>a. Sepsis</td>
</tr>
<tr>
<td></td>
<td>b. Acute respiratory distress syndrome (&quot;ARDS&quot;)</td>
</tr>
<tr>
<td></td>
<td>c. Death of organs</td>
</tr>
<tr>
<td></td>
<td>d. Death of organism</td>
</tr>
<tr>
<td>6.</td>
<td>Disseminated intravascular coagulation (&quot;DIC&quot;)</td>
</tr>
</tbody>
</table>

### C 11.1.12.9 – Discuss the assessment of a patient suffering from shock.

<p>| | |</p>
<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>1.</td>
<td>Scene size-up</td>
</tr>
<tr>
<td>2.</td>
<td>Perform a primary assessment</td>
</tr>
<tr>
<td>3.</td>
<td>Obtain a relevant history</td>
</tr>
<tr>
<td>4.</td>
<td>Perform a secondary assessment</td>
</tr>
<tr>
<td>5.</td>
<td>Perform a reassessment</td>
</tr>
</tbody>
</table>

### C 11.1.12.10 – Discuss the management of a patient suffering from shock.

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Manual in-line spinal stabilization, as needed</td>
</tr>
<tr>
<td>2.</td>
<td>Comfort, calm, and reassure the patient</td>
</tr>
<tr>
<td>3.</td>
<td>Do not give food or drink</td>
</tr>
<tr>
<td>4.</td>
<td>Airway control</td>
</tr>
<tr>
<td>5.</td>
<td>Breathing</td>
</tr>
<tr>
<td></td>
<td>a. Assist ventilation, as needed</td>
</tr>
<tr>
<td></td>
<td>b. Oxygen administration (high concentration)</td>
</tr>
<tr>
<td>6.</td>
<td>Circulation</td>
</tr>
<tr>
<td></td>
<td>a. Attempt to control obvious external bleeding</td>
</tr>
<tr>
<td></td>
<td>b. Patient position</td>
</tr>
<tr>
<td></td>
<td>c. Keep patient work (attempt to maintain normal body temperature)</td>
</tr>
<tr>
<td>7.</td>
<td>Pneumatic anti-shock garment (&quot;PASG&quot;) application</td>
</tr>
<tr>
<td>8.</td>
<td>Fluid resuscitation</td>
</tr>
<tr>
<td></td>
<td>a. Controllable external hemorrhage</td>
</tr>
<tr>
<td></td>
<td>b. Uncontrollable external hemorrhage</td>
</tr>
<tr>
<td></td>
<td>c. Internal hemorrhage</td>
</tr>
<tr>
<td>9.</td>
<td>Consider medications, as needed</td>
</tr>
<tr>
<td>10.</td>
<td>Begin transport at the earliest possible moment</td>
</tr>
<tr>
<td>11.</td>
<td>Treat any additional injuries that might be present</td>
</tr>
</tbody>
</table>

### C 11.1.12.11 – Identify devices to assist circulation in patients suffering from shock.

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Impedance threshold device</td>
</tr>
</tbody>
</table>

### C 11.1.12.12 – Identify differences between pediatric and geriatric patients suffering from shock.

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Pediatrics</td>
</tr>
<tr>
<td></td>
<td>a. Common causes of shock</td>
</tr>
<tr>
<td></td>
<td>i. Trauma</td>
</tr>
<tr>
<td></td>
<td>ii. Fluid loss</td>
</tr>
<tr>
<td></td>
<td>iii. Neurological injury</td>
</tr>
<tr>
<td></td>
<td>iv. Anaphylaxis</td>
</tr>
<tr>
<td></td>
<td>v. Heart disease</td>
</tr>
</tbody>
</table>
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

<table>
<thead>
<tr>
<th>Objective</th>
<th>Educational Standard</th>
</tr>
</thead>
</table>
| 12.1.2 – Incidence/Significance of Trauma | 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 | 1. Components (hospital categorizations)  
2. Levels and qualifications  
3. Transport considerations |
| 12.1.4 – Types of Injury | 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.**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Standard precautions</td>
</tr>
<tr>
<td>2.</td>
<td>Scene size-up</td>
</tr>
<tr>
<td>3.</td>
<td>General impression</td>
</tr>
<tr>
<td>4.</td>
<td>Mechanism of injury</td>
</tr>
<tr>
<td>5.</td>
<td>Primary assessment</td>
</tr>
<tr>
<td>6.</td>
<td>Baseline vital signs</td>
</tr>
<tr>
<td>7.</td>
<td>History</td>
</tr>
<tr>
<td>8.</td>
<td>Secondary assessment</td>
</tr>
<tr>
<td>9.</td>
<td>Reassessment</td>
</tr>
</tbody>
</table>

**C 12.1.5.2 – Differentiate between significant and non-significant mechanisms of injury (“MOI”).**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Significant MOI (including, but not limited to):</td>
</tr>
<tr>
<td></td>
<td>a. Multiple body systems injured</td>
</tr>
<tr>
<td></td>
<td>b. Vehicle crashes with intrusion</td>
</tr>
<tr>
<td></td>
<td>c. Falls from heights</td>
</tr>
<tr>
<td></td>
<td>d. Pedestrian versus vehicle collision</td>
</tr>
<tr>
<td></td>
<td>e. Motorcycle crashes</td>
</tr>
<tr>
<td></td>
<td>f. Death of an occupant in the same vehicle</td>
</tr>
<tr>
<td>2.</td>
<td>Non-significant MOI</td>
</tr>
<tr>
<td></td>
<td>a. Isolated trauma to a body part</td>
</tr>
<tr>
<td></td>
<td>b. Falls without loss of consciousness (adult)</td>
</tr>
<tr>
<td></td>
<td>c. Falls without loss of consciousness (pediatric)</td>
</tr>
<tr>
<td>3.</td>
<td>Pediatric considerations</td>
</tr>
<tr>
<td></td>
<td>a. Falls &gt; 10 feet without loss of consciousness</td>
</tr>
<tr>
<td></td>
<td>b. Falls &lt; 10 feet with loss of consciousness</td>
</tr>
<tr>
<td></td>
<td>c. Bicycle collision</td>
</tr>
<tr>
<td></td>
<td>d. Medium to high-speed vehicle collision (&gt;25 mph)</td>
</tr>
<tr>
<td>4.</td>
<td>Reevaluating the MOI</td>
</tr>
<tr>
<td>5.</td>
<td>Special considerations</td>
</tr>
<tr>
<td></td>
<td>a. Spinal precautions must be initiated as soon as practical based on the MOI</td>
</tr>
<tr>
<td></td>
<td>b. When practical, log roll the supine patient on their side to allow for an appropriate assessment of the posterior body</td>
</tr>
</tbody>
</table>

**C 12.1.5.3 – Describe the primary assessment of a trauma patient.**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>1.</td>
<td>Airway</td>
</tr>
<tr>
<td></td>
<td>a. Clear airway (chin-lift, suction, finger sweep)</td>
</tr>
<tr>
<td></td>
<td>b. Protect airway</td>
</tr>
<tr>
<td></td>
<td>i. Decrease LOC, bleeding is ET without neck movement</td>
</tr>
<tr>
<td></td>
<td>ii. Surgical airways</td>
</tr>
<tr>
<td>2.</td>
<td>Breathing</td>
</tr>
<tr>
<td></td>
<td>a. Assess ventilation capability</td>
</tr>
<tr>
<td></td>
<td>b. Oxygenation (100%)</td>
</tr>
<tr>
<td></td>
<td>c. Check thorax and neck</td>
</tr>
<tr>
<td></td>
<td>i. Deviated trachea</td>
</tr>
<tr>
<td></td>
<td>ii. Tension pneumothorax</td>
</tr>
<tr>
<td></td>
<td>iii. Chest wounds and chest wall motion</td>
</tr>
<tr>
<td></td>
<td>iv. Sucking chest wound</td>
</tr>
<tr>
<td></td>
<td>v. Neck and chest crepitation</td>
</tr>
<tr>
<td></td>
<td>vi. Multiple broken ribs</td>
</tr>
<tr>
<td></td>
<td>vii. Fractured sternum</td>
</tr>
<tr>
<td></td>
<td>d. Listen for breath sounds</td>
</tr>
<tr>
<td></td>
<td>i. Re-check any ET tube placement</td>
</tr>
</tbody>
</table>
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, bounding 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

<table>
<thead>
<tr>
<th>P 12.1.5.5 – Manage trauma care.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Selective spinal immobilization</td>
</tr>
<tr>
<td>2. Spinal immobilization</td>
</tr>
<tr>
<td>a. Assessment-based</td>
</tr>
<tr>
<td>b. Cervical collar</td>
</tr>
<tr>
<td>c. Long board</td>
</tr>
<tr>
<td>d. Manual stabilization</td>
</tr>
<tr>
<td>e. Seated patient (KED, short board, etc.)</td>
</tr>
<tr>
<td>3. Splinting</td>
</tr>
<tr>
<td>a. Manual</td>
</tr>
<tr>
<td>b. Pelvic Wrap / PASG</td>
</tr>
<tr>
<td>c. Rigid</td>
</tr>
<tr>
<td>d. Soft</td>
</tr>
<tr>
<td>e. Traction</td>
</tr>
<tr>
<td>f. Vacuum</td>
</tr>
<tr>
<td>4. Emergency moves for endangered patient</td>
</tr>
<tr>
<td>5. Rapid extrication</td>
</tr>
</tbody>
</table>

| 12.1.6 – Role of Documentation in Trauma |

<table>
<thead>
<tr>
<th>C 12.1.6.1 – Discuss the role of documentation in caring for victims of trauma.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Topical anatomy</td>
</tr>
<tr>
<td>2. Scenario sections of patient care reports</td>
</tr>
<tr>
<td>a. Mechanism of injury with specifics</td>
</tr>
<tr>
<td>b. Response time</td>
</tr>
<tr>
<td>c. Time on scene</td>
</tr>
<tr>
<td>d. Initial findings</td>
</tr>
<tr>
<td>e. Changes in assessment findings</td>
</tr>
<tr>
<td>f. Care provided</td>
</tr>
<tr>
<td>g. Important negative findings</td>
</tr>
<tr>
<td>h. Recreate the scene</td>
</tr>
<tr>
<td>i. Bystander care provided prior to arrival</td>
</tr>
<tr>
<td>j. A complete report is essential and will be referred to by hospital personnel</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>12.1.7 – Trauma Scoring Scales</th>
</tr>
</thead>
<tbody>
<tr>
<td>C 12.1.7.1 – Discuss trauma scoring scales.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>12.1.8 – Trauma Center Designations</th>
</tr>
</thead>
<tbody>
<tr>
<td>C 12.1.8.1 – Discuss trauma center designations.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>12.1.9 – Transfer of Patients to the Most Appropriate Hospital</th>
</tr>
</thead>
<tbody>
<tr>
<td>C 12.1.9.1 – Discuss the transfer of trauma patients to the most appropriate hospital.</td>
</tr>
</tbody>
</table>
### 12.2 – Bleeding

<table>
<thead>
<tr>
<th>Objective</th>
<th>Educational Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>12.2.1 – Incidence</strong></td>
<td></td>
</tr>
</tbody>
</table>
| *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 |
### C 12.2.3.3 – Discuss the classifications of shock as related to traumatic bleeding.

<table>
<thead>
<tr>
<th>Classification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Respiratory failure</td>
<td>a. Obstruction – Airway, embolism</td>
</tr>
<tr>
<td></td>
<td>b. Chest wall movement</td>
</tr>
<tr>
<td></td>
<td>c. Diffusion failure (ARDS)</td>
</tr>
<tr>
<td></td>
<td>d. Toxic exposures – Carbon monoxide, cyanide</td>
</tr>
<tr>
<td>Hypovolemic</td>
<td>a. External</td>
</tr>
<tr>
<td></td>
<td>b. Internal</td>
</tr>
<tr>
<td></td>
<td>c. Third space losses – Fractures, thermal burns</td>
</tr>
<tr>
<td>Vascular failure</td>
<td>a. Central nervous system loss</td>
</tr>
<tr>
<td></td>
<td>b. Sepsis</td>
</tr>
<tr>
<td></td>
<td>c. Anaphylaxis</td>
</tr>
<tr>
<td>Cardiac failure</td>
<td>a. Intrinsic</td>
</tr>
<tr>
<td></td>
<td>b. Extrinsic</td>
</tr>
<tr>
<td></td>
<td>i. Cardiac tamponade</td>
</tr>
<tr>
<td></td>
<td>ii. Tension pneumothorax</td>
</tr>
</tbody>
</table>

### C 12.2.3.4 – Discuss compensatory shock as related to traumatic bleeding.

<table>
<thead>
<tr>
<th>Compensation</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Respiratory compensation</td>
<td>a. Baroreceptors</td>
</tr>
<tr>
<td></td>
<td>b. Chemoreceptors</td>
</tr>
<tr>
<td>Sympathetic nervous system</td>
<td>a. Alpha receptors</td>
</tr>
<tr>
<td></td>
<td>b. Beta receptors</td>
</tr>
<tr>
<td></td>
<td>c. Role of shunting</td>
</tr>
<tr>
<td>Neuroendocrine response</td>
<td>a. ACTH</td>
</tr>
<tr>
<td></td>
<td>b. Aldosterone</td>
</tr>
<tr>
<td></td>
<td>c. Renin</td>
</tr>
<tr>
<td></td>
<td>d. Vasopressin</td>
</tr>
<tr>
<td></td>
<td>e. ADH</td>
</tr>
<tr>
<td>Fluid shifts in shock</td>
<td></td>
</tr>
</tbody>
</table>

### C 12.2.3.5 – Discuss decompensated shock as related to traumatic bleeding.

<table>
<thead>
<tr>
<th>Effects</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Life effects</td>
<td>a. Age</td>
</tr>
<tr>
<td></td>
<td>b. Physical fitness</td>
</tr>
<tr>
<td></td>
<td>c. Alcohol use</td>
</tr>
<tr>
<td></td>
<td>d. Medications</td>
</tr>
<tr>
<td>Irreversible shock</td>
<td></td>
</tr>
<tr>
<td>Blood loss in shock</td>
<td>a. 750 cc's in health people is well-tolerated (15%)</td>
</tr>
<tr>
<td></td>
<td>b. Up to 30% or more is significant</td>
</tr>
<tr>
<td></td>
<td>i. Tachycardia</td>
</tr>
<tr>
<td></td>
<td>ii. Anxiety</td>
</tr>
<tr>
<td></td>
<td>iii. Narrow pulse pressure</td>
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<tr>
<td></td>
<td>c. Greater than 30%</td>
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<tr>
<td></td>
<td>i. Hypotension</td>
</tr>
</tbody>
</table>
### 12.0 – Trauma

<table>
<thead>
<tr>
<th>C 12.2.3.6 – Discuss the complications of shock as related to traumatic bleeding.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Acute respiratory distress syndrome (“ARDS”)</td>
</tr>
<tr>
<td>a. Seen 24 to 48 hours after insult/injury</td>
</tr>
<tr>
<td>b. Loss of alveolar and capillary wall integrity</td>
</tr>
<tr>
<td>c. Treated with PEEP</td>
</tr>
<tr>
<td>2. Acute renal failure</td>
</tr>
<tr>
<td>a. Damage to renal tubules</td>
</tr>
<tr>
<td>b. Failure to excrete products of metabolism</td>
</tr>
<tr>
<td>3. Multiple organ failure syndrome (“MOFS”)</td>
</tr>
</tbody>
</table>

### 12.2.4 – Assessment Consideration in Shock

<table>
<thead>
<tr>
<th>C 12.2.4.1 – Discuss assessment considerations for a patient in shock due to traumatic bleeding.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Review knowledge from previous levels</td>
</tr>
<tr>
<td>2. Scene size-up</td>
</tr>
<tr>
<td>a. Assure personal safety</td>
</tr>
<tr>
<td>i. Hazard awareness</td>
</tr>
<tr>
<td>ii. Traffic safety</td>
</tr>
<tr>
<td>iii. Ambulance placement strategy</td>
</tr>
<tr>
<td>iv. Mood of bystanders</td>
</tr>
<tr>
<td>v. Vehicle stability</td>
</tr>
<tr>
<td>b. Number of patients present</td>
</tr>
<tr>
<td>c. Significant MOI (including, but not limited to):</td>
</tr>
<tr>
<td>i. Multi-systems trauma</td>
</tr>
<tr>
<td>ii. Ejection from vehicle</td>
</tr>
<tr>
<td>iii. Fall &gt; 20 feet without loss of consciousness</td>
</tr>
<tr>
<td>iv. Fall &lt; 20 feet with loss of consciousness</td>
</tr>
<tr>
<td>v. Vehicle roll-over</td>
</tr>
<tr>
<td>vi. High-speed vehicle collision</td>
</tr>
<tr>
<td>vii. Vehicle vs. pedestrian collision</td>
</tr>
<tr>
<td>viii. Motorcycle collision</td>
</tr>
<tr>
<td>ix. Significant external blood loss (&gt; 1,000 cc)</td>
</tr>
<tr>
<td>x. Penetrations of the head, chest, abdomen, or pelvis</td>
</tr>
<tr>
<td>xi. Unresponsive or altered mental status with suspected traumatic origin</td>
</tr>
<tr>
<td>xii. Death or major injury of another occupant in same vehicle</td>
</tr>
<tr>
<td>d. Crime scene considerations</td>
</tr>
<tr>
<td>e. Scene time considerations (not to exceed 10 minutes)</td>
</tr>
<tr>
<td>f. Airway</td>
</tr>
<tr>
<td>i. Foreign body obstruction</td>
</tr>
<tr>
<td>ii. Airway integrity</td>
</tr>
<tr>
<td>1. Structural damage</td>
</tr>
<tr>
<td>2. Edema</td>
</tr>
<tr>
<td>3. Airway movement over trachea</td>
</tr>
<tr>
<td>g. Ventilation</td>
</tr>
<tr>
<td>i. Breathing patterns</td>
</tr>
<tr>
<td>1. Tracheal tugging</td>
</tr>
<tr>
<td>2. Diaphragmatic movement</td>
</tr>
</tbody>
</table>
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                                                                                     | 1. Scene safety |
| 2. Body substance isolation precautions                                                             | 2. Body substance isolation precautions |
| 3. Restore tissue oxygenation                                                                      | 3. Restore tissue oxygenation |
| a. Airway – Open throughout care                                                                  | a. Airway – Open throughout care |
| ii. Unconscious patient airway 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 $\text{SaO}_2$ between 90% and 92%
   ii. Small drops in $\text{SaO}_2$ 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 agglutination
   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)
### 12.2.6 – Bleeding Considerations

**C 12.2.6.1 – Discuss the pathophysiology, assessment findings, and management considerations for a patient with traumatic bleeding.**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
</table>
| 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  

ii. Internal considerations
### 12.3 – Chest Trauma

<table>
<thead>
<tr>
<th>Objective</th>
<th>Educational Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>12.3.1 – Incidence of Chest Trauma</strong></td>
<td></td>
</tr>
</tbody>
</table>
| *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 adventitia 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  
   ii. Hoarseness  
   j. 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 |
### 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
### 12.0 – Trauma

#### 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 loss 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 |  

---

- f. Clotting in the chest may release fibrolysins (continue bleeding process)
- g. Loss of circulating blood in vessels

#### 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

| 2. Specific assessment 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 |  

---

1. Open
2. Fluid bolus and continued hypovolemia assessment (see Trauma: Bleeding)
3. Rapid transport to appropriate facility
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 output)
      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
### 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 from 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 (overhydration 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 |
## Objective – Abdominal and Genitourinary Trauma

### 12.4.1 – Incidence

<table>
<thead>
<tr>
<th>Objective</th>
<th>Educational Standard</th>
</tr>
</thead>
</table>
| **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

<table>
<thead>
<tr>
<th>Objective</th>
<th>Educational Standard</th>
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</table>
| **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 the 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
### 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
### 12.4.5.1 – Discuss the pathophysiology, assessment considerations, and management of a patient with an evisceration.

1. **Pathophysiology**
   - Review knowledge from previous levels
   - Open injury to abdominal wall, which allows protrusion of abdominal contents
   - Strangulation of bowel by abdominal wall
   - Loss of fluid and temperature regulation of exposed bowel

2. **Special assessment findings**
   - Review knowledge from previous levels
   - Exposed bowel (may be large or small)
   - Bowel protrudes with increase in abdominal Pressure (cough)
   - Maybe recent post-surgical patient at home (cough, straining)

3. **Special management considerations**
   - Review knowledge from previous levels
   - AVO
   - Circulation
   - Pain relief considerations
   - Cover bowel with sterile saline gauze
   - Patient may find relief with knee bent
   - Avoid coughing

### 12.4.6 – Retroperitoneal Injury

#### 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

#### 12.4.7.1 – Discuss the pathophysiology, assessment considerations, and management of a patient with an injury to the external genitalia.

1. **Pathophysiology**
   - 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
   - Female
     i. Pain
     ii. Swelling
2. **Special assessment findings**
   - Male external genitalia
     i. Pain
     ii. Swelling
   - 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**
   - Review knowledge from previous levels
   - Male
     i. Treat amputations as with other
12.0 – Trauma

---

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

<table>
<thead>
<tr>
<th>C 12.4.8.1 – Identify differences between pediatric and geriatric patients suffering from abdominal and genitourinary trauma.</th>
<th>1. Pediatrics</th>
<th>2. Geriatrics</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Pediatrics</td>
<td>2. Geriatrics</td>
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</tbody>
</table>
## 12.5 – Orthopedic Trauma

### 12.5.1 – Incidence

*C 12.5.1.1 – Describe the morbidity and mortality of orthopedic trauma, including prevention strategies.*

<table>
<thead>
<tr>
<th>Objective</th>
<th>Educational Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Morbidity/mortality</td>
<td></td>
</tr>
<tr>
<td>a. Upper extremity</td>
<td></td>
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<tr>
<td>b. Lower extremity</td>
<td></td>
</tr>
<tr>
<td>2. Prevention</td>
<td></td>
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</tbody>
</table>

### 12.5.2 – Pediatric Fractures

*C 12.5.2.1 – Discuss the pathophysiology, assessment considerations, and management of pediatric fractures.*

<table>
<thead>
<tr>
<th>Objective</th>
<th>Educational Standard</th>
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</thead>
<tbody>
<tr>
<td>1. Pathophysiology</td>
<td></td>
</tr>
<tr>
<td>a. Review previous knowledge</td>
<td></td>
</tr>
<tr>
<td>b. Types of fractures</td>
<td></td>
</tr>
<tr>
<td>i. Epiphyseal (at bone growth plate)</td>
<td></td>
</tr>
<tr>
<td>ii. Greenstick (incomplete fracture from bending bone)</td>
<td></td>
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<tr>
<td>iii. Torus (buckling of cortex of bone)</td>
<td></td>
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<tr>
<td>c. Immature growth of bones</td>
<td></td>
</tr>
<tr>
<td>d. Growth plates at end of bones and complications of epiphyseal fractures</td>
<td></td>
</tr>
<tr>
<td>2. Special assessment findings</td>
<td></td>
</tr>
<tr>
<td>a. Review previous knowledge</td>
<td></td>
</tr>
<tr>
<td>b. MOI (assess for abuse)</td>
<td></td>
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<tr>
<td>c. Motor, sensory, pulse assessment distal to injury</td>
<td></td>
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<tr>
<td>d. Child/parent interaction</td>
<td></td>
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<tr>
<td>e. Age differences and reaction to trauma</td>
<td></td>
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<tr>
<td>f. Assess for comorbidity</td>
<td></td>
</tr>
<tr>
<td>3. Special management considerations</td>
<td></td>
</tr>
<tr>
<td>a. Review previous knowledge</td>
<td></td>
</tr>
<tr>
<td>b. AVO</td>
<td></td>
</tr>
<tr>
<td>c. Transport with family members</td>
<td></td>
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<tr>
<td>d. Consent issues when family not present, injury not serious</td>
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<tr>
<td>e. Inform family, teachers, guardians of transport location</td>
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<tr>
<td>f. Immobilization the same as adults</td>
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<tr>
<td>g. Ice will reduce swelling</td>
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</tbody>
</table>

### 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).*

<table>
<thead>
<tr>
<th>Objective</th>
<th>Educational Standard</th>
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<tbody>
<tr>
<td>1. Pathophysiology</td>
<td></td>
</tr>
<tr>
<td>a. Review previous knowledge</td>
<td></td>
</tr>
<tr>
<td>b. Physiology of tendons</td>
<td></td>
</tr>
<tr>
<td>c. Achilles tendon rupture</td>
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<tr>
<td>d. Patellar (knee)</td>
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</tr>
<tr>
<td>i. Twisting of the knee in sports activities</td>
<td></td>
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<tr>
<td>ii. Anterior cruciate ligament</td>
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<tr>
<td>iii. Posterior cruciate ligament</td>
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<tr>
<td>iv. Lateral collateral ligament</td>
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<tr>
<td>v. Medial collateral ligament</td>
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<tr>
<td>vi. Compression injury (direct blow to knee)</td>
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<tr>
<td>vii. Lateral and medial sprains (abnormal</td>
<td></td>
</tr>
</tbody>
</table>
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
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 acromioclavicular 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

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<thead>
<tr>
<th>Objective</th>
<th>Educational Standard</th>
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</thead>
<tbody>
<tr>
<td><strong>12.6.1 – Incidence of Soft Tissue Injury</strong></td>
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<tr>
<td>C 12.6.1.1 – Describe the morbidity and mortality of soft tissue trauma.</td>
<td>N/A</td>
</tr>
<tr>
<td><strong>12.6.2 – Anatomy and Physiology of Soft Tissue Injury</strong></td>
<td></td>
</tr>
</tbody>
</table>
| 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  
v. 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 |
### C.12.6.4.2 - Discuss the pathophysiology, assessment considerations, and management of bite wounds.

#### 1. Pathophysiology – Types

**a. Animal**
- Dog may cause any kind of soft tissue injury
- Elderly and young most susceptible to infection
- Cat bites, more infectious (pasteurella multocida)

**b. Human**
- May cause any kind of soft tissue wound
- Most frequently the hand
- Secondary infection due to delay in treatment
- Multiple types of bacteria may cause the infection

**c. Insect**
- Spider bites
  - **Black widow**
  - **Brown recluse**
- Fire ants
- Wasps
- Bees
- Tick bites
- Scorpion stings

**d. Rabies**

#### 2. Special assessment findings

**a. Animal**
- Note time since bite
- Type of animal

**b. Human**
- Cause of wound
- Location
- Presence of infection due to delay in seeking treatment

**c. Insect**
- Black widow
- Brown recluse
- Fire ants
- 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**
- Scene safety (assure animal secured)
- Control hemorrhage
- Clean wound
- 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  

<table>
<thead>
<tr>
<th>C 12.6.4.3 – Discuss the pathophysiology, assessment considerations, and management of lacerations.</th>
</tr>
</thead>
</table>
| 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  

<table>
<thead>
<tr>
<th>C 12.6.4.4 – Discuss the pathophysiology, assessment considerations, and management of puncture words.</th>
</tr>
</thead>
</table>
| 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  

12.6 – Soft Tissue Trauma
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

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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,
### Acids
- Cause coagulation necrosis and immediate pain
- Frequently doesn’t injure deeper tissues
- Amount of damage depends on concentration of agent, quality of the agent, length of exposure, and depth of penetration

### Organic compounds

#### Special assessment findings
- Skin damage will depend on agent, length of exposure, BSB
- Know the agent
- Read the label
- Seek consultation with poison center

#### Special management considerations
- Use protective clothing/equipment when necessary
- Flush with copious amounts of water
- Alkalis may require several hours of irrigation
- Do not use neutralizing agents

---

**C 12.6.5.3 – Discuss the pathophysiology, assessment considerations, and management of thermal burns.**

#### Pathophysiology
- Heat absorbed exceeds capacity to dissipate it
- Depth will depend on time of contact and source
- Age variances with burns
- Severity depends on:
  - Burn agent
  - Burn circumstances
  - Location of the burn on the body
  - Age of the patient
  - Concomitant injuries
  - Preexisting injuries
- Epidermis injured
- Epidermis and varying layers of dermis
- Burn extends into subcutaneous tissue possibly including bone and muscle tissue
- Burns and burn effect on other body systems
  - Cardiovascular involvement
  - Pulmonary involvement
  - Renal involvement
  - GI involvement
  - Hematological involvement
  - Endocrine involvement

#### Special assessment finding
- Superficial partial thickness burn
- Moderate-deep partial thickness
  - Red, moist surface, with extreme sensitivity (pain) to any stimuli
  - Formation of blisters is very common
  - 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
def. 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

<table>
<thead>
<tr>
<th>12.6.6 – High-Pressure Injection Wounds</th>
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<tbody>
<tr>
<td>C 12.6.6.1 – Discuss the pathophysiology, assessment considerations, and management of high-pressure injection wounds.</td>
</tr>
<tr>
<td>1. Pathophysiology</td>
</tr>
<tr>
<td>2. Special assessment findings</td>
</tr>
<tr>
<td>3. Special management considerations</td>
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</tbody>
</table>
# 12.7 – Head, Face, Neck, and Spine Trauma

## 12.7.1 – Introduction

<table>
<thead>
<tr>
<th>Objective</th>
<th>Educational Standard</th>
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</table>
| 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

<table>
<thead>
<tr>
<th>Objective</th>
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</table>
| 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
### 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 ototrrhea
   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
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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. Hemoptyysis
   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. Hemoptyysis
   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
### 12.7.9 – Mandibular Fractures

*C 12.7.9.1 – Discuss the pathophysiology, assessment considerations, and management of mandibular fractures.*

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<tbody>
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<td>1.</td>
<td>Pathophysiology</td>
</tr>
<tr>
<td>2.</td>
<td>Specific assessment considerations</td>
</tr>
<tr>
<td></td>
<td>a. Malocclusion of the teeth</td>
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<td></td>
<td>b. Pain</td>
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<td></td>
<td>c. Point tenderness</td>
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<tr>
<td></td>
<td>d. Ecchymosis on the floor of the mouth</td>
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<tr>
<td>3.</td>
<td>Specific management considerations</td>
</tr>
<tr>
<td></td>
<td>a. AVO</td>
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<tr>
<td></td>
<td>b. Non-use of nasal airways</td>
</tr>
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<td></td>
<td>c. Ice</td>
</tr>
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<td></td>
<td>d. Monitor closely</td>
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</tbody>
</table>
# 12.8 – Nervous System Trauma

## Objective 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 |

## Objective 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. Hyperesthesia and later anesthesia in groin d. Incontinence e. Sexual dysfunction 3. Special management considerations |

## Objective 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 |

## Objective 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 |

## Objective 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 \( \text{PaO}_2 \) 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
### 12.8.7 – Spinal Shock

C 12.8.7.1 – Discuss the pathophysiology, assessment considerations, and management of spinal shock.

<table>
<thead>
<tr>
<th>C 12.8.7.1 – Discuss the pathophysiology, assessment considerations, and management of spinal shock.</th>
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<tbody>
<tr>
<td>1. Pathophysiology</td>
</tr>
<tr>
<td>a. Loss of control between injury site and brain</td>
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<tr>
<td>b. Vasodilation</td>
</tr>
<tr>
<td>c. Loss of balance between parasympathetic and sympathetic nervous systems</td>
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<tr>
<td>d. Lasts 7 to 20 days</td>
</tr>
<tr>
<td>e. Autonomic hyperreflexia</td>
</tr>
<tr>
<td>2. Special assessment considerations</td>
</tr>
<tr>
<td>a. Flaccid muscles</td>
</tr>
<tr>
<td>b. Paralysis</td>
</tr>
<tr>
<td>c. Absence of sensation</td>
</tr>
<tr>
<td>d. Hypotension</td>
</tr>
<tr>
<td>e. Hypothermia</td>
</tr>
<tr>
<td>3. Special management considerations</td>
</tr>
<tr>
<td>a. AVO</td>
</tr>
<tr>
<td>b. IV bolus</td>
</tr>
<tr>
<td>c. Vasopressor considerations</td>
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</tbody>
</table>

| 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                      |
d. Pharmacological assistance
### 12.9 – Special Considerations in Trauma

#### Objective

<table>
<thead>
<tr>
<th>Educational Standard</th>
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<tbody>
<tr>
<td><strong>12.9.1 – Trauma in Pregnancy</strong></td>
</tr>
<tr>
<td>C 12.9.1.1 – Discuss the incidence, pathophysiology, assessment considerations, and management of traumatic injury given a pregnant patient.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>1. Incidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Mortality/morbidity</td>
</tr>
<tr>
<td>b. Risk factors</td>
</tr>
<tr>
<td>c. Prevention</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>2. Pathophysiology</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Exhibit responses different due to physiologic changes during pregnancy</td>
</tr>
<tr>
<td>b. Mother</td>
</tr>
<tr>
<td>i. Blood volume changes</td>
</tr>
<tr>
<td>ii. Respiratory changes</td>
</tr>
<tr>
<td>iii. GI and intra-abdominal changes</td>
</tr>
<tr>
<td>c. Fetus</td>
</tr>
<tr>
<td>d. Fetal death caused by:</td>
</tr>
<tr>
<td>i. Maternal loss (trauma leading to shock)</td>
</tr>
<tr>
<td>ii. Abruptio placentae (need high index of suspicion)</td>
</tr>
<tr>
<td>e. Abdominal injuries</td>
</tr>
<tr>
<td>f. Pelvic fracture</td>
</tr>
<tr>
<td>g. Traumatic arrest</td>
</tr>
<tr>
<td>h. Seat belt injuries</td>
</tr>
<tr>
<td>i. Sexual assault</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>3. Special considerations in assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Increased heart rate is not an early sign of hypovolemic shock</td>
</tr>
<tr>
<td>b. Significant blood loss may not be reflective of usual signs of shock</td>
</tr>
<tr>
<td>c. Respiratory rate less than 20 should not be considered adequate ventilation</td>
</tr>
<tr>
<td>d. Loss of landmarks for chest compressions in arrest</td>
</tr>
<tr>
<td>e. MOI and signs of abruption placentae</td>
</tr>
<tr>
<td>f. Estimate gestational age of baby</td>
</tr>
<tr>
<td>g. Palpate uterine fundus</td>
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<tr>
<td>h. Attempt to listen to fetal heart tones (4 o’clock position, about 2” from mother umbilicus)</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>4. Special considerations in management</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Airway, breathing, and circulation</td>
</tr>
<tr>
<td>b. Maternal management</td>
</tr>
<tr>
<td>c. Fetal assessment</td>
</tr>
</tbody>
</table>

#### 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. |

<table>
<thead>
<tr>
<th>1. Unique pediatric aspects of trauma</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Most common is motor vehicle-related</td>
</tr>
<tr>
<td>b. Blunt trauma most prevalent MOI</td>
</tr>
<tr>
<td>c. Intentional injuries</td>
</tr>
<tr>
<td>d. Suicide in adolescents</td>
</tr>
<tr>
<td>e. Children in trauma more rapidly decompensate</td>
</tr>
<tr>
<td>f. Child abuse causes trauma</td>
</tr>
<tr>
<td>g. Strong catecholamine capabilities</td>
</tr>
</tbody>
</table>
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 $80 + 2 \times \text{the age}$
      vi. Appropriate blood pressure cuff size
      vii. $80 \text{ ml/kg}$ 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
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
### 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.**

<p>| | |</p>
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| 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  |

i. Mask seal  
ii. Cervical kyphosis  
iii. Oxygen saturation can quickly deteriorate  
b. Circulation – Over hydration in patient with cardiac history
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

<table>
<thead>
<tr>
<th>Objective</th>
<th>Educational Standard</th>
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<tbody>
<tr>
<td><strong>12.10.1 – Incidence</strong></td>
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</tbody>
</table>
| 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 |
12.0 – Trauma

12.10 – Environmental Emergencies

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. Variable and non-specific
         2. Weakness, fatigue, headache, impaired judgment, vertigo
      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

<table>
<thead>
<tr>
<th>12.10.4 – Bites and Envenomations</th>
</tr>
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</table>

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"
### 12.0 – Trauma

<p>| | |</p>
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<thead>
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<tbody>
<tr>
<td>ii.</td>
<td>Ground current or step voltage</td>
</tr>
<tr>
<td>iii.</td>
<td>Blunt trauma</td>
</tr>
<tr>
<td>iv.</td>
<td>Contact</td>
</tr>
<tr>
<td>v.</td>
<td>Major problem is cardiorespiratory (as opposed to cardiopulmonary) arrest (massive DC countershock)</td>
</tr>
<tr>
<td>d.</td>
<td>May cause head trauma, cardiac damage, burns, extremity vasospasm, paresis, or paresthesias</td>
</tr>
</tbody>
</table>

#### 2. Special assessment considerations

- Scene safety
- Assess for cardiac arrest

#### 3. Special management considerations

- AVO
- Cardiac arrest management
- Burn wound care
- Transport

---

### 12.10.6 – High Altitude Illness

C 12.10.6.1 – Discuss the pathophysiology, assessment considerations, and management of high altitude illness.

<p>| | |</p>
<table>
<thead>
<tr>
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<tbody>
<tr>
<td>1.</td>
<td>Pathophysiology</td>
</tr>
<tr>
<td>2.</td>
<td>Special assessment considerations</td>
</tr>
<tr>
<td>a.</td>
<td>Vary depending on speed of ascent and time at elevation – Headache, anorexia, nausea, fatigue, dizziness, difficulty sleeping</td>
</tr>
<tr>
<td>b.</td>
<td>HAPE (high altitude pulmonary edema)</td>
</tr>
<tr>
<td>c.</td>
<td>High altitude retinal hemorrhage</td>
</tr>
<tr>
<td>3.</td>
<td>Special management considerations</td>
</tr>
<tr>
<td>a.</td>
<td>Reduce altitude as fast as possible</td>
</tr>
<tr>
<td>b.</td>
<td>Mile cases are self-limited</td>
</tr>
<tr>
<td>c.</td>
<td>Moderate, aspirin, acetaminophen</td>
</tr>
<tr>
<td>d.</td>
<td>Severe requires diuretics, oxygen, steroids</td>
</tr>
<tr>
<td>e.</td>
<td>Prevention is best, man patients take acetazolamide</td>
</tr>
</tbody>
</table>
## 12.11 – Multi-System Trauma

### Objective

<table>
<thead>
<tr>
<th>Educational Standard</th>
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<tbody>
<tr>
<td><strong>12.11.1 – Kinematics of Trauma</strong></td>
</tr>
</tbody>
</table>

#### 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 (stabtings)
      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.

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</table>
|   | 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.

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</table>
|   | 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 flow.
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<tr>
<td>12.0 – Trauma</td>
<td>2011 WI Paramedic Curriculum</td>
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</tbody>
</table>

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

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<th>Objective</th>
<th>Educational Standard</th>
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<tbody>
<tr>
<td><strong>13.1.1 – Introduction</strong></td>
<td></td>
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</tbody>
</table>
| *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 |
### 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.**

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<tbody>
<tr>
<td>1.</td>
<td>Premonitory signs of labor</td>
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<tr>
<td></td>
<td>a. Lightening</td>
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<td></td>
<td>b. Braxton Hicks</td>
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<td>c. Cervical changes</td>
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<td></td>
<td>d. Bloody show</td>
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<tr>
<td></td>
<td>e. Rupture membrane</td>
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<td></td>
<td>f. Other</td>
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<td>2.</td>
<td>Stages of labor and delivery</td>
</tr>
<tr>
<td></td>
<td>a. First stage</td>
</tr>
<tr>
<td></td>
<td>i. Latent</td>
</tr>
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<td>ii. Active</td>
</tr>
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<td>iii. Transition</td>
</tr>
<tr>
<td></td>
<td>b. Second stage</td>
</tr>
<tr>
<td></td>
<td>i. Spontaneous birth</td>
</tr>
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<td></td>
<td>ii. Positional changes of the fetus</td>
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<td></td>
<td>1. Descent</td>
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<td>2. Flexion</td>
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<td>3. Internal rotation</td>
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<td>4. Extension</td>
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<td>5. Restitution</td>
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<td>6. External rotation</td>
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<td>7. Expulsion</td>
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<td></td>
<td>c. Third stage</td>
</tr>
<tr>
<td></td>
<td>i. Placental separation</td>
</tr>
<tr>
<td></td>
<td>ii. Placental delivery</td>
</tr>
<tr>
<td></td>
<td>d. Maternal response to labor</td>
</tr>
<tr>
<td></td>
<td>i. Cardiovascular</td>
</tr>
<tr>
<td></td>
<td>ii. Respiratory</td>
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<td></td>
<td>iii. Renal</td>
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<td></td>
<td>iv. Gastrointestinal</td>
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<tr>
<td></td>
<td>v. Immune system</td>
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<tr>
<td></td>
<td>vi. Pain</td>
</tr>
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<td></td>
<td>e. Fetal response to labor</td>
</tr>
<tr>
<td></td>
<td>i. Heart rate</td>
</tr>
<tr>
<td></td>
<td>ii. Acid-base status</td>
</tr>
<tr>
<td></td>
<td>iii. Hemodynamic</td>
</tr>
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<td>iv. Sensation</td>
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3. Assessment of the pregnant patient

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<tbody>
<tr>
<td>a.</td>
<td>Airway, breathing, circulation</td>
</tr>
<tr>
<td>b.</td>
<td>Initial assessment</td>
</tr>
<tr>
<td>c.</td>
<td>SAMPLE history</td>
</tr>
<tr>
<td>d.</td>
<td>Vital signs</td>
</tr>
<tr>
<td>e.</td>
<td>Obstetrical history</td>
</tr>
<tr>
<td>f.</td>
<td>Physical examination</td>
</tr>
<tr>
<td>g.</td>
<td>Evaluating gestational age</td>
</tr>
</tbody>
</table>
### 13.0 – Special Patient Populations

<table>
<thead>
<tr>
<th>13.1.4 – Complications Related to Pregnancy</th>
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</thead>
<tbody>
<tr>
<td><strong>C 13.1.4.1 – Discuss pathophysiology, assessment, and management of complications related to pregnancy.</strong></td>
</tr>
<tr>
<td>1. Abuse</td>
</tr>
<tr>
<td>2. Substance abuse</td>
</tr>
<tr>
<td>3. Supine hypotensive disorder</td>
</tr>
<tr>
<td>4. Diabetes mellitus</td>
</tr>
<tr>
<td>a. Pathophysiology</td>
</tr>
<tr>
<td>b. Assessment</td>
</tr>
<tr>
<td>c. Management</td>
</tr>
<tr>
<td>5. Various cardiac disorders</td>
</tr>
<tr>
<td>a. Pathophysiology</td>
</tr>
<tr>
<td>b. Assessment</td>
</tr>
<tr>
<td>c. Management</td>
</tr>
<tr>
<td>6. Bleeding related to pregnancy</td>
</tr>
<tr>
<td>a. Pathophysiology</td>
</tr>
<tr>
<td>b. Assessment</td>
</tr>
<tr>
<td>c. Management</td>
</tr>
<tr>
<td>d. Abortion</td>
</tr>
<tr>
<td>i. Elective abortion</td>
</tr>
<tr>
<td>ii. Spontaneous abortion</td>
</tr>
<tr>
<td>iii. Threatened</td>
</tr>
<tr>
<td>iv. Imminent</td>
</tr>
<tr>
<td>v. Complete</td>
</tr>
<tr>
<td>vi. Incomplete</td>
</tr>
<tr>
<td>vii. Missed</td>
</tr>
<tr>
<td>viii. Habitual</td>
</tr>
<tr>
<td>ix. Septic</td>
</tr>
<tr>
<td>e. Ectopic pregnancy</td>
</tr>
<tr>
<td>7. Placental problems</td>
</tr>
<tr>
<td>a. Pathophysiology</td>
</tr>
<tr>
<td>b. Assessment</td>
</tr>
<tr>
<td>c. Management</td>
</tr>
<tr>
<td>d. Abruptio placentae</td>
</tr>
<tr>
<td>e. Placenta previa</td>
</tr>
</tbody>
</table>

- Fundal measurement
- Calculating estimated date of birth
- Fetal movement
- Fetal heart tones
- Deep tendon reflexes
- 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
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, assessment, complications, and management of delivery. |
| 1. Cephalic presentation |
assessment, complications, and management of complicated deliveries.

<table>
<thead>
<tr>
<th>1.</th>
<th>Uterine atony</th>
</tr>
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<tbody>
<tr>
<td>2.</td>
<td>Lacerations</td>
</tr>
<tr>
<td>3.</td>
<td>Retained placental fragments</td>
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<tr>
<td>4.</td>
<td>Shoulder dystocia</td>
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<tr>
<td>5.</td>
<td>Nuchal cord</td>
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<tr>
<td>6.</td>
<td>Prolapse of cord</td>
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<tr>
<td>7.</td>
<td>Postpartum complications</td>
</tr>
<tr>
<td>a.</td>
<td>Pathophysiology</td>
</tr>
<tr>
<td>b.</td>
<td>Assessment</td>
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<td>c.</td>
<td>Complications</td>
</tr>
<tr>
<td>d.</td>
<td>Management</td>
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<td>e.</td>
<td>Inverted uterus</td>
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<td>f.</td>
<td>Hemorrhage</td>
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<tr>
<td>g.</td>
<td>Embolism</td>
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<tr>
<td>h.</td>
<td>Post partum depression</td>
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</tbody>
</table>

- 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 13.2.1 – Introduction

<table>
<thead>
<tr>
<th>Objective</th>
<th>Educational Standard</th>
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</table>
| 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) |

## Objective 13.2.2 – General Pathophysiology, Assessment, and Management

<table>
<thead>
<tr>
<th>Objective</th>
<th>Educational Standard</th>
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</table>
| 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. Fetal 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 |

---

13.2 – Neonatal Care  
Page 295
iii. Pierre Robin syndrome
iv. Cleft lip
v. Other craniofacial defects
vi. Spina bifida
vii. Exposed abdominal contents
  1. Intact omphalocoele
  2. Non-intact omphalocoele
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. Laryngoscope
   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 on 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 and 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 anomalies
      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

d. Causes
   i. Hypoglycemia
   ii. Other
      a. Hypoxic-ischemic encephalopathy
      b. Intracranial hemorrhage
      c. Metabolic disturbances
      d. Meningitis or encephalopathy
      e. Developmental abnormalities
      f. Drug withdrawal
   iii. Seizure imitators
      a. Gastro esophageal reflux disease (“GERD”)
      b. Choking episode
      c. Tremors
      d. Myoclonic jerks

e. Assessment findings
   i. Decreased level of consciousness
   ii. Seizure activity
   iii. Apnea/bradycardia

f. Management considerations
   i. Airway and ventilation
   ii. Circulation
   iii. Pharmacological
13.0 – Special Patient Populations

13.2 – Neonatal Care

13.2 – Neonatal Care

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 to 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 sign of a life-threatening illness
      3. Bilious vomiting indicative of obstruction in proximal portion of duodenum
         a. Malrotation with volvulus
         b. Jejunal 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
### 13.0 – Special Patient Populations

#### 13.1 – Neonatal Care

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

<table>
<thead>
<tr>
<th>a. Epidemiology</th>
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<tbody>
<tr>
<td>i. Incidence</td>
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<tr>
<td>ii. Morbidity/mortality</td>
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<tr>
<td>1. Severe cases can cause dehydration</td>
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<tr>
<td>2. Bacterial or viral infection may be involved</td>
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<td>iii. Risk factors</td>
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<tr>
<th>b. Anatomy and physiology review</th>
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<tr>
<td>c. Pathophysiology</td>
</tr>
<tr>
<td>i. Gastroenteritis</td>
</tr>
<tr>
<td>ii. Necrotizing enterocolitis</td>
</tr>
<tr>
<td>iii. Lactose intolerance</td>
</tr>
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<td>iv. Phototherapy</td>
</tr>
<tr>
<td>v. Neonatal abstinence syndrome</td>
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<tr>
<td>vi. Thyrotoxicosis</td>
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<tr>
<td>vii. Cystic fibrosis</td>
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<td>viii. Allergic process</td>
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<tr>
<th>d. Assessment findings</th>
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</thead>
<tbody>
<tr>
<td>i. Loose stools</td>
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<tr>
<td>ii. Decreased urinary output</td>
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<td>iii. Signs of dehydration</td>
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<th>e. Management considerations</th>
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<tbody>
<tr>
<td>i. Airway and ventilation</td>
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<td>ii. Circulation</td>
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<td>iii. Pharmacological (fluid therapy may be indicated)</td>
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<tr>
<td>iv. Transport considerations (identify facility to handle high-risk newborn)</td>
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</table>
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. Pathophisiology
   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. Subconjunctival 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 of 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
<p>| | |</p>
<table>
<thead>
<tr>
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<tbody>
<tr>
<td>iii.</td>
<td>Pharmacology</td>
</tr>
<tr>
<td>iv.</td>
<td>Non-pharmacological</td>
</tr>
<tr>
<td>v.</td>
<td>Transport consideration (identify facility to handle high-risk newborn)</td>
</tr>
<tr>
<td>vi.</td>
<td>Psychological support/communication strategies</td>
</tr>
</tbody>
</table>
### 13.3 – Pediatrics

<table>
<thead>
<tr>
<th>Objective</th>
<th>Educational Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>13.3.1 – Pediatric Anatomical Variations and Assessment</strong></td>
<td></td>
</tr>
<tr>
<td><strong>C 13.3.1.1 – Differentiate the anatomical differences between the pediatric and adult head.</strong></td>
<td>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</td>
</tr>
<tr>
<td><strong>C 13.3.1.2 – Differentiate the anatomical differences between the pediatric and adult airway.</strong></td>
<td>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</td>
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</table>
### C 13.3.1.3 – Differentiate the anatomical differences between the pediatric and adult chest and lungs.

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<tr>
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<tbody>
<tr>
<td>1.</td>
<td>Ribs are more cartilaginous and pliable</td>
</tr>
<tr>
<td>2.</td>
<td>Less overlying muscle and fat to protect ribs and vital organs</td>
</tr>
<tr>
<td>3.</td>
<td>Young children breathe primarily with their diaphragms; their chest muscles are immature and fatigue easily</td>
</tr>
<tr>
<td>4.</td>
<td>Lung tissue is more fragile</td>
</tr>
<tr>
<td>5.</td>
<td>Mediastinum (the heart and major vessels) is more mobile within the chest</td>
</tr>
<tr>
<td>6.</td>
<td>Thin chest wall allows for easily transmitted breath sounds</td>
</tr>
<tr>
<td>7.</td>
<td>Implications for the health care provider</td>
</tr>
<tr>
<td>a.</td>
<td>Infants and children are dependent on effective diaphragmatic excursion for adequate ventilation; a distended abdomen may not allow for this</td>
</tr>
<tr>
<td>b.</td>
<td>Rib fractures are less common; but when present represent a significant force generally accompanied by multi-system injury</td>
</tr>
<tr>
<td>c.</td>
<td>The elastic thorax may result in significant underlying organ injury despite a fairly normal appearing external exam</td>
</tr>
<tr>
<td>d.</td>
<td>Pulmonary contusions are more common</td>
</tr>
<tr>
<td>e.</td>
<td>Lungs are more prone to pneumothorax from excessive pressures while bag-mask ventilating</td>
</tr>
<tr>
<td>f.</td>
<td>Mobility of mediastinal structures makes children more sensitive to tension pneumothorax and flail chest</td>
</tr>
<tr>
<td>g.</td>
<td>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</td>
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</tbody>
</table>

### C 13.3.1.4 – Differentiate the anatomical differences between the pediatric and adult abdomen.

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<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>1.</td>
<td>Less developed abdominal muscles offer less protection</td>
</tr>
<tr>
<td>2.</td>
<td>Abdominal organs are situated more anteriorly and are less protected by ribs</td>
</tr>
<tr>
<td>3.</td>
<td>Liver and spleen are proportionally larger</td>
</tr>
<tr>
<td>4.</td>
<td>Implications for the health care provider</td>
</tr>
<tr>
<td>a.</td>
<td>Seemingly insignificant forces can cause serious internal injury; therefore, abdominal pain after trauma should be taken seriously</td>
</tr>
<tr>
<td>b.</td>
<td>Liver, spleen, and kidneys are more frequently injured</td>
</tr>
<tr>
<td>c.</td>
<td>Multiple organs injured more commonly</td>
</tr>
</tbody>
</table>

### C 13.3.1.5 – Differentiate the anatomical differences between the pediatric and adult extremities.

<p>| | |</p>
<table>
<thead>
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<tbody>
<tr>
<td>1.</td>
<td>Bones are softer</td>
</tr>
<tr>
<td>2.</td>
<td>Injuries to the growth plates of long bones may result in poor bone growth</td>
</tr>
<tr>
<td>3.</td>
<td>Open growth plates are weaker than ligaments and tendons</td>
</tr>
<tr>
<td>4.</td>
<td>Growth plates generally disappear two years after their have their first periods; in boys, it is usually my mid to late high school</td>
</tr>
</tbody>
</table>
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

<table>
<thead>
<tr>
<th>C 13.3.1.6 – Differentiate the anatomical differences between the pediatric and adult skin and body surface area.</th>
</tr>
</thead>
</table>
| 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 |

<table>
<thead>
<tr>
<th>C 13.3.1.7 – Differentiate the anatomical differences between the pediatric and adult respiratory system.</th>
</tr>
</thead>
</table>
| 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 |

<table>
<thead>
<tr>
<th>C 13.3.1.8 – Differentiate the anatomical differences between the pediatric and adult nervous system and spinal column.</th>
</tr>
</thead>
</table>
| 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 | 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 as 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 healthcare 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

<table>
<thead>
<tr>
<th>C 13.3.2.2</th>
<th>Discuss the physical, cognitive, and emotional development of toddlers.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. 12 to 18 months</td>
<td></td>
</tr>
<tr>
<td>a. Physical development</td>
<td></td>
</tr>
<tr>
<td>b. Cognitive development</td>
<td></td>
</tr>
<tr>
<td>i. Imitation of older children and parents</td>
<td></td>
</tr>
<tr>
<td>ii. Make-believe play</td>
<td></td>
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<tr>
<td>iii. Understand more than what they can express</td>
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<tr>
<td>iv. Know major body parts</td>
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<tr>
<td>v. Know four to six words</td>
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<tr>
<td>c. Emotional development</td>
<td></td>
</tr>
<tr>
<td>d. Implications for the health care provider</td>
<td></td>
</tr>
<tr>
<td>i. Persistent crying or irritability can be a</td>
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</tbody>
</table>
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 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 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 clingingness 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
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

<table>
<thead>
<tr>
<th>C 13.3.2.3 – Discuss the physical, cognitive, and emotional development of preschoolers.</th>
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</thead>
<tbody>
<tr>
<td>1. Two to five years</td>
</tr>
<tr>
<td>2. Physical development</td>
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<tr>
<td>a. Bodies become leaner</td>
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<tr>
<td>b. Develop 20/20 vision by age four</td>
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<tr>
<td>c. Have all their teeth by three</td>
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<tr>
<td>d. They perfect normal walking and running</td>
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<tr>
<td>e. Begin throwing, catching, and kicking</td>
</tr>
<tr>
<td>f. Generally establish left or right handedness</td>
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<tr>
<td>g. Toilet training</td>
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<tr>
<td>3. Cognitive development</td>
</tr>
<tr>
<td>a. Most rapid increase in language</td>
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<tr>
<td>b. Magical thinking</td>
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<tr>
<td>c. Rules tend to be absolute</td>
</tr>
<tr>
<td>d. Irrational fears</td>
</tr>
<tr>
<td>4. Emotional development</td>
</tr>
<tr>
<td>a. Learn what are acceptable behaviors</td>
</tr>
<tr>
<td>b. Have tantrums around control issues</td>
</tr>
<tr>
<td>c. Modesty develops</td>
</tr>
<tr>
<td>5. Implications for the health care provider</td>
</tr>
<tr>
<td>a. Avoid procedures on the dominant hand or arm</td>
</tr>
<tr>
<td>b. The rapid increase in language means they will understand much of what you say if simple terms are used</td>
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<td>c. Respect the patient’s modesty and cover them up after the physical examination</td>
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<tr>
<td>d. Foreign body airway obstruction risk continues to be high</td>
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<tr>
<td>e. Offer choices to the patient if appropriate (i.e., listen to the front first or the back?)</td>
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<tr>
<td>f. Do not waste time trying to use logic to convince preschoolers; they are concrete thinkers; avoid frightening or misleading comments</td>
</tr>
</tbody>
</table>
| 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

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<thead>
<tr>
<th>C 13.3.2.4 – Discuss the physical, cognitive, and emotional development during middle childhood.</th>
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<tbody>
<tr>
<td>1. Six to 12 years</td>
</tr>
<tr>
<td>2. Physical development</td>
</tr>
<tr>
<td>3. Cognitive development</td>
</tr>
<tr>
<td>a. Begin to think logically</td>
</tr>
<tr>
<td>b. Life centers around school</td>
</tr>
<tr>
<td>4. Emotional development</td>
</tr>
<tr>
<td>a. Popularity and peer pressure become very important</td>
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<tr>
<td>b. Children with chronic illness or disabilities begin to be very self-conscious</td>
</tr>
<tr>
<td>c. Children begin to understand that death is final</td>
</tr>
<tr>
<td>5. Implications for the health care provider</td>
</tr>
<tr>
<td>a. With patients loosing baby teeth and developing adult teeth, one must be particularly careful when intubating</td>
</tr>
<tr>
<td>b. School-aged children understand simple explanations for illness and treatments</td>
</tr>
<tr>
<td>c. Be honest about procedures that will cause them discomfort</td>
</tr>
<tr>
<td>d. Give children some sense of control by giving choices if possible</td>
</tr>
<tr>
<td>e. Reassure children that everything is going to be all right, if appropriate, and that they are not going to die</td>
</tr>
<tr>
<td>f. Respect the child’s modesty and cover them up after the physical examination</td>
</tr>
<tr>
<td>g. Asking about school will often allow children to warm up to you faster</td>
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</tbody>
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<thead>
<tr>
<th>C 13.3.2.5 – Discuss the physical, cognitive, and emotional development of adolescents.</th>
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<tbody>
<tr>
<td>1. 12 to 20 years</td>
</tr>
<tr>
<td>2. Physical development (puberty begins)</td>
</tr>
<tr>
<td>a. Girls first develop breasts around eight to 13 years; menstruation starts between nine and 16</td>
</tr>
<tr>
<td>b. Boys first develop increase in testicle size, which typically starts around ten</td>
</tr>
<tr>
<td>3. Cognitive development</td>
</tr>
<tr>
<td>a. Acquire the ability to reason</td>
</tr>
<tr>
<td>b. Do not see possibilities as real things that could happen to them</td>
</tr>
<tr>
<td>c. Develop morals</td>
</tr>
<tr>
<td>4. Emotional development</td>
</tr>
<tr>
<td>a. Self-conscious about body image</td>
</tr>
<tr>
<td>b. Begin to understand who they are and begin to be comfortable with that</td>
</tr>
<tr>
<td>c. Relationships generally transition from mostly same sex ones to those with the opposite sex</td>
</tr>
<tr>
<td>5. Implications for the healthcare provider</td>
</tr>
<tr>
<td>a. Explain things clearly and honestly as you would to an adult</td>
</tr>
<tr>
<td>b. Give the adolescent choices when appropriate</td>
</tr>
<tr>
<td>c. Respect the adolescent’s modesty and cover them up after the physical examination</td>
</tr>
</tbody>
</table>
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 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.*

<table>
<thead>
<tr>
<th>1. Respiratory compromise</th>
<th>a. Introduction</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>i. Epidemiology</td>
</tr>
<tr>
<td></td>
<td>ii. Anatomic and physiologic differences in children</td>
</tr>
<tr>
<td>b. Pathophysiology</td>
<td>i. Respiratory distress</td>
</tr>
<tr>
<td></td>
<td>ii. Respiratory failure</td>
</tr>
<tr>
<td></td>
<td>iii. Respiratory arrest</td>
</tr>
<tr>
<td>c. Assessment</td>
<td>i. History (age, preceding symptoms, choking episode, underlying disease, sick contacts, prematurity)</td>
</tr>
<tr>
<td></td>
<td>ii. Physical findings (mental status, respiratory rate, pulse oximetry, capnometry, work of breathing, color, heart rate, degree of aeration, presence of stridor or wheeze)</td>
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<tr>
<td>d. Upper airway obstruction</td>
<td>i. Croup</td>
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<td></td>
<td>ii. Foreign body aspiration</td>
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<td></td>
<td>iii. Bacterial tracheitis</td>
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<td>iv. Epiglottis</td>
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<tr>
<td></td>
<td>v. Tracheostomy dysfunction</td>
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<tr>
<td>e. Lower airway disease</td>
<td>i. Asthma</td>
</tr>
<tr>
<td></td>
<td>ii. Bronchiolitis (respiratory syncytial virus [“RSV”] is common cause)</td>
</tr>
<tr>
<td></td>
<td>1. Highly contagious</td>
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<tr>
<td></td>
<td>2. Most common in infants under one year</td>
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<td></td>
<td>3. Infections usually occur epidemically in the winter</td>
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<td>f. Pneumonia</td>
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<tr>
<td>g. Foreign body lower airway obstruction</td>
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<tr>
<td>h. Pertussis</td>
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<tr>
<td>i. Cystic fibrosis</td>
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<tr>
<td>j. Bronchopulmonary dysplasia (“BPD”)</td>
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<tr>
<td></td>
<td>i. Chronic lung disease that usually occurs in infants born prematurely and treated with positive pressure ventilation and high oxygen concentrations</td>
</tr>
<tr>
<td></td>
<td>ii. Recurrent respiratory infections and exercise</td>
</tr>
</tbody>
</table>
### 13.0 - Special Patient Populations

**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 (fospentyoin, 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
13.0 – Special Patient Populations

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
   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
   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, Hirschsprung'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, Hennoch 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
   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
13.0 – Special Patient Populations

13.3 – Pediatrics

| 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

#### 13.4.1 – Normal and Abnormal Changes Associated with Aging

**C 13.4.1.1 – Discuss normal and abnormal changes associated with aging.**

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

---

13.4 – Geriatrics
of aging that impact pharmokinetics.

1. Decrease in amount of body water
2. Decrease in muscle mass
3. Increase in body fat
4. Renal function deterioration
5. Liver function deterioration
6. 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
13.0 – Special Patient Populations

13. 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, ventilator, 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
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

<table>
<thead>
<tr>
<th>Objective</th>
<th>Educational Standard</th>
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</thead>
<tbody>
<tr>
<td><strong>13.5.1 – Abuse and Neglect</strong></td>
<td></td>
</tr>
</tbody>
</table>
| 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

<table>
<thead>
<tr>
<th>Objective</th>
<th>Educational Standard</th>
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<tbody>
<tr>
<td>1. Advocate for patient rights and appropriate care</td>
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<tr>
<td>2. Identify facilities that will treat regardless of payment</td>
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<tr>
<td>3. Prevention strategies will likely be absent,</td>
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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
### 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

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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
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

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
### 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
### 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
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
      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
13.0 – Special Patient Populations

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
1. Schizophrenia
2. Bipolar disorder (manic-depressive illness)
3. 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
### 13.0 – Special Patient Populations

<p>| | |</p>
<table>
<thead>
<tr>
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<tbody>
<tr>
<td><strong>e.</strong></td>
<td><strong>Assessment</strong></td>
</tr>
<tr>
<td>i.</td>
<td>Decreased range of motion/mobility may limit physical examination</td>
</tr>
<tr>
<td>ii.</td>
<td>Be sure to solicit current medications before considering the administration of medications</td>
</tr>
<tr>
<td><strong>f.</strong></td>
<td><strong>Management and transportation strategies</strong></td>
</tr>
<tr>
<td><strong>g.</strong></td>
<td>Consider the patient's limited mobility</td>
</tr>
<tr>
<td><strong>h.</strong></td>
<td>Equipment (e.g., backboards, splints) must be adjusted to “fit the patient” (not vice versa) by supplying adequate padding to fill all voids</td>
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<tbody>
<tr>
<td><strong>2.</strong></td>
<td><strong>Cancer</strong></td>
</tr>
<tr>
<td><strong>a.</strong></td>
<td>A group of diseases that allow for an unrestrained growth of cells in one or more of the body organs or tissues</td>
</tr>
<tr>
<td><strong>b.</strong></td>
<td>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</td>
</tr>
<tr>
<td><strong>c.</strong></td>
<td><strong>Special considerations</strong></td>
</tr>
<tr>
<td><strong>d.</strong></td>
<td>Signs and symptoms depend on the cancer's primary site of origin</td>
</tr>
<tr>
<td><strong>e.</strong></td>
<td>Many cancer patients take anticancer drugs and pain medications through surgically implanted ports (e.g., mediports)</td>
</tr>
<tr>
<td><strong>f.</strong></td>
<td>Transdermal skin patches that contain analgesic agents are common</td>
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<tbody>
<tr>
<td><strong>3.</strong></td>
<td><strong>Cerebral palsy (&quot;CP&quot;)</strong></td>
</tr>
<tr>
<td><strong>a.</strong></td>
<td>General term for nonprogressive disorders of movement and posture</td>
</tr>
<tr>
<td><strong>b.</strong></td>
<td>Results from damage to the fetal brain during later months of pregnancy, during birth, during the newborn period, or in early childhood</td>
</tr>
<tr>
<td><strong>c.</strong></td>
<td><strong>Causes</strong></td>
</tr>
<tr>
<td>i.</td>
<td>Most common cause is cerebral digenesis (abnormal cerebral development) or cerebral malformation</td>
</tr>
<tr>
<td>ii.</td>
<td>Less common causes include the following:</td>
</tr>
<tr>
<td>1.</td>
<td>Fetal hypoxia</td>
</tr>
<tr>
<td>2.</td>
<td>Birth trauma</td>
</tr>
<tr>
<td>3.</td>
<td>Maternal infection</td>
</tr>
<tr>
<td>4.</td>
<td>Kernicterus (excessive fetal bilirubin, associated with hemolytic disease)</td>
</tr>
<tr>
<td><strong>d.</strong></td>
<td>Produces abnormal stiffness and contraction of groups of muscles</td>
</tr>
<tr>
<td><strong>e.</strong></td>
<td>Child may be categorized as having one of the following conditions:</td>
</tr>
<tr>
<td>i.</td>
<td>Diplegia (affecting all four limbs; the legs more severely than the arms)</td>
</tr>
<tr>
<td>ii.</td>
<td>Hemiplegia (affecting limbs only on one side of the body; the arm usually more...</td>
</tr>
</tbody>
</table>
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 then 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
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

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 90 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.

<table>
<thead>
<tr>
<th>Objective</th>
<th>Educational Standard</th>
</tr>
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<tbody>
<tr>
<td><strong>14.2.1 – National Incident Management System (&quot;NIMS&quot;)</strong></td>
<td></td>
</tr>
<tr>
<td>C 14.2.1.1 – Complete FEMA IS-700 and IS-100 training.</td>
<td>Online IS-100: <a href="http://emilms.fema.gov/IS100b/index.htm">http://emilms.fema.gov/IS100b/index.htm</a> IS-700: <a href="http://emilms.fema.gov/IS700aNEW/index.htm">http://emilms.fema.gov/IS700aNEW/index.htm</a></td>
</tr>
<tr>
<td>P 14.2.1.2 – Apply National Incident Management System (&quot;NIMS&quot;) standards.</td>
<td>N/A</td>
</tr>
</tbody>
</table>
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.

<table>
<thead>
<tr>
<th>Objective</th>
<th>Educational Standard</th>
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<tbody>
<tr>
<td>14.3.1 – Triage Systems</td>
<td></td>
</tr>
<tr>
<td>P 14.3.1.1 – Utilize a triage system for mitigating multiple casualty incidents.</td>
<td>1. START</td>
</tr>
<tr>
<td></td>
<td>2. JUMPSTART</td>
</tr>
<tr>
<td></td>
<td>3. SALT</td>
</tr>
</tbody>
</table>
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.

<table>
<thead>
<tr>
<th>Objective</th>
<th>Educational Standard</th>
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</thead>
<tbody>
<tr>
<td>14.4.1 – Medical Risks/Needs/Advantages</td>
<td></td>
</tr>
<tr>
<td>C 14.4.1.1 – Describe the medical risks, needs, and advantages to utilizing air medical services.</td>
<td>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</td>
</tr>
</tbody>
</table>
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.

<table>
<thead>
<tr>
<th>Objective</th>
<th>Educational Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>14.5.1 – Safe Vehicle Extrication</strong></td>
<td><strong>C 14.5.1.1 – Discuss safety considerations integral to vehicle extrication operations.</strong></td>
</tr>
</tbody>
</table>
| 1. Role of EMS in vehicle extrication | 1. Provide patient care
|  | 2. Perform simple extrication |
| 2. Personal safety | 3. First priority for all EMS personnel
|  | a. Appropriate personal protective equipment for conditions |
|  | b. Scene size-up |
| 3. Patient safety | 3. Personal protective equipment for all EMS personnel |
|  | a. Keep them informed of your actions |
| 4. Situational safety | b. Protect from further harm |
|  | 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 |
### 14.5.2 – Use of Simple Hand Tools

**C 14.5.2.1 – Identify simple hand tools that can be used for vehicle extrication.**

<table>
<thead>
<tr>
<th>Tool</th>
<th>Description</th>
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<tbody>
<tr>
<td>1.</td>
<td>Hammer</td>
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<tr>
<td>2.</td>
<td>Center punch</td>
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<tr>
<td>3.</td>
<td>Pry bar</td>
</tr>
<tr>
<td>4.</td>
<td>Hack saw</td>
</tr>
<tr>
<td>5.</td>
<td>Come-along</td>
</tr>
</tbody>
</table>

### 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.**

<table>
<thead>
<tr>
<th>Task</th>
<th>Description</th>
</tr>
</thead>
</table>
| 1.   | Removing patient  
 a.维持手摇颈椎的稳定化  
 b. 完成初步评估  
 c. 提供关键干预措施 |
| 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.

<table>
<thead>
<tr>
<th>Objective</th>
<th>Educational Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>C 14.6.1.1 – Hazardous Materials Awareness</strong></td>
<td>OSHA 29 CFR 1910.120 requirements</td>
</tr>
<tr>
<td>Complete hazardous materials awareness/cold zone operations (HAZWOPER) training.</td>
<td></td>
</tr>
<tr>
<td><strong>C 14.6.1.2 – Comply with Wisconsin weapons of mass destruction (“WMD”) training requirements.</strong></td>
<td>N/A</td>
</tr>
<tr>
<td><strong>P 14.6.1.3 – Prepare for the treatment of patients exposed to hazardous materials.</strong></td>
<td>N/A</td>
</tr>
</tbody>
</table>
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

**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.

<table>
<thead>
<tr>
<th>Objective</th>
<th>Educational Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Role of EMS</td>
<td>1. Role of EMS</td>
</tr>
<tr>
<td>a. Personal safety</td>
<td>a. Personal safety</td>
</tr>
<tr>
<td>b. Provide patient care</td>
<td>b. Provide patient care</td>
</tr>
<tr>
<td>c. Initiate/operate in an incident command system (“ICS”)</td>
<td>c. Initiate/operate in an incident command system (“ICS”)</td>
</tr>
<tr>
<td>d. Assist with operations</td>
<td>d. Assist with operations</td>
</tr>
<tr>
<td>2. Safety</td>
<td>2. Safety</td>
</tr>
<tr>
<td>a. Personal</td>
<td>a. Personal</td>
</tr>
<tr>
<td>i. First priority for all EMS personnel</td>
<td>i. First priority for all EMS personnel</td>
</tr>
<tr>
<td>ii. Appropriate personnel protective equipment for conditions</td>
<td>ii. Appropriate personnel protective equipment for conditions</td>
</tr>
<tr>
<td>iii. Scene size-up</td>
<td>iii. Scene size-up</td>
</tr>
<tr>
<td>iv. Time, distance, and shielding for self-protection</td>
<td>iv. Time, distance, and shielding for self-protection</td>
</tr>
<tr>
<td>v. Emergency responders are targets</td>
<td>v. Emergency responders are targets</td>
</tr>
<tr>
<td>vi. Dangers of the secondary attack</td>
<td>vi. Dangers of the secondary attack</td>
</tr>
<tr>
<td>b. Patient</td>
<td>b. Patient</td>
</tr>
<tr>
<td>i. Keep them informed of your actions</td>
<td>i. Keep them informed of your actions</td>
</tr>
<tr>
<td>ii. Protect from further harm</td>
<td>ii. Protect from further harm</td>
</tr>
<tr>
<td>iii. Signs and symptoms of biological, nuclear, incendiary, chemical, and explosive (“B-NICE”) substances</td>
<td>iii. Signs and symptoms of biological, nuclear, incendiary, chemical, and explosive (“B-NICE”) substances</td>
</tr>
<tr>
<td>iv. Concept of “greater good” as it relates to any delay</td>
<td>iv. Concept of “greater good” as it relates to any delay</td>
</tr>
<tr>
<td>v. Treating terrorists/criminals</td>
<td>v. Treating terrorists/criminals</td>
</tr>
<tr>
<td>c. 360° assessment and scene size-up</td>
<td>c. 360° assessment and scene size-up</td>
</tr>
<tr>
<td>i. Outward signs and characteristics of terrorist incidents</td>
<td>i. Outward signs and characteristics of terrorist incidents</td>
</tr>
<tr>
<td>ii. Outward signs of a weapons of mass destruction (“WMD”) incident</td>
<td>ii. Outward signs of a weapons of mass destruction (“WMD”) incident</td>
</tr>
<tr>
<td>iii. Outward signs and protective actions of biological, nuclear, incendiary, chemical, and explosive (“B-NICE”) weapons</td>
<td>iii. Outward signs and protective actions of biological, nuclear, incendiary, chemical, and explosive (“B-NICE”) weapons</td>
</tr>
<tr>
<td>d. Determine number of patients (implement local multiple-casualty incident [“MCI”] protocols as necessary)</td>
<td>d. Determine number of patients (implement local multiple-casualty incident [“MCI”] protocols as necessary)</td>
</tr>
<tr>
<td>e. Evaluate need for additional resources</td>
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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 – Discuss 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 5.1.2.1 - 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 5.1.4.1 - 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.
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 10.5.5.1.1 – 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.
Summary of Objectives

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 10.8.9.4 – 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

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 prehospital 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, Bartholin’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

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.
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 a 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 – Commtotio 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 wounds.

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 pharmacokinetics.

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 – Discuss 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
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 – Terminaly 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.
P 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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