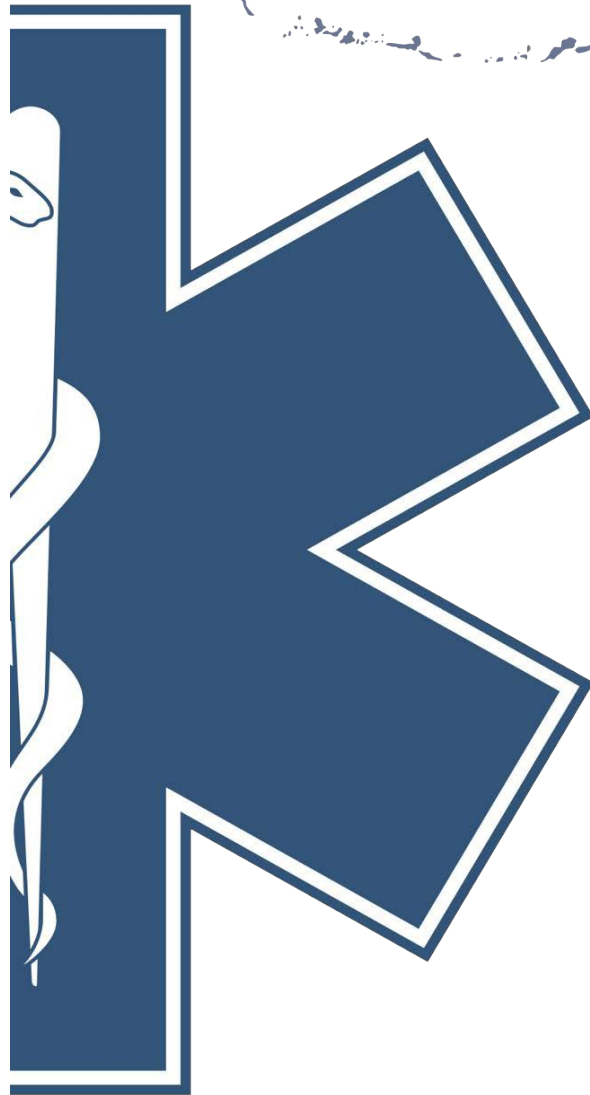
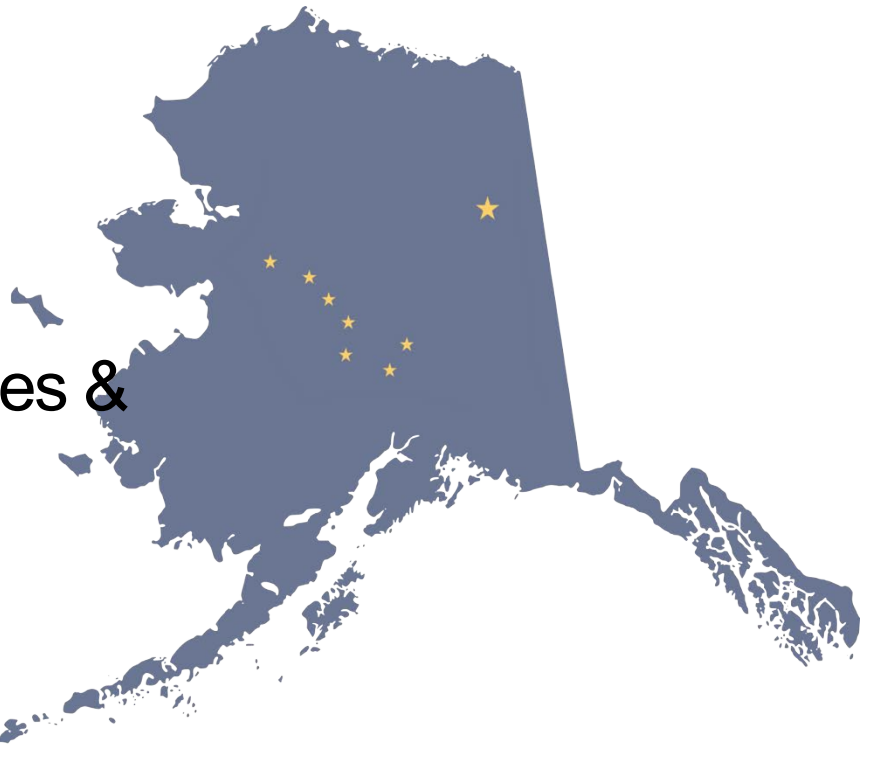


Alaska EMS NR-AEMT to AK-AEMT Course Objectives & Lesson Plan



Alaska Council on EMS Committees:
EMS Training Committee and
Implementation Task Force
in cooperation with the
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Services
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STATE OF ALASKA OFFICE OF EMERGENCY MEDICAL SERVICES

TRANSITION FROM NR AEMT to AK-AEMT COURSE

The purpose of this course is to transition National Registry AEMTs (including new AEMT classes in Alaska to the AK-AEMT. This course is for those that either are coming into the State as NR-AEMTs or they are in the process of taking a National Registry AEMT course and want to conclude the course with an AK-AEMT certification. The material in this course includes the Scope of Practice items that are not in the National Registry AEMT but are part of the AK-AEMT, EMT-2 and EMT-3 curriculum. The material is meant to be covered in a time frame that guides the student to become competent with their knowledge and abilities. That means they can remember, understand, apply, analyze, evaluate and create. It is the responsibility of the Course Coordinator and Medical Director to determine competency for each student. Time listed is a recommendation only- (approx. **30 hrs** without the ACLS and 12-Lead information).

Table of Contents

Lesson 1: Preparatory EMS Systems (2 hrs) 3

Lesson 2: Principles of Pharmacology (8 hrs) 4

Lesson 3: Pain Management (2 hrs) – 7

Lesson 4: Respiratory Emergencies (1 hr : primarily review and add medications) 10

Lesson 5: Cardiovascular Emergencies (8-12 hours) 12

Lesson 6: Neurology (2 hrs)..... 22

Lesson 7: Psychiatric (Review) (2 hrs)..... 24

Lesson 8: Shock (Basic Review with endpoint of administration of TXA) (2 hrs)..... 29

Lesson 9: 12 Lead ECG Course –(8 hrs for initial – 4 hrs review) 33

Lesson 10: Skills Lab/Competencies 35

Example Schedule 36

Example Equipment List- 10 students..... 37

Lesson 1: Preparatory EMS Systems (2 hrs)

Objectives:

- 1.1 Define the role of the AEMT in Alaska
- 1.2 Compare and contrast the roles of an EMT 1, EMT 2, EMT 3, Alaska AEMT, and MICP
- 1.3 Describe the relationship between a physician on the scene, the AEMT on the scene, and the EMS physician providing medical direction.
- 1.4 Review Medical, Legal and Ethical Issues as they pertain to Patient Care
 - a. State the conditions that require an Alaska AEMT to notify local law enforcement officials.

Psychomotor Objectives:

There are no psychomotor objectives for this section

Lesson Content

- A. AK-AEMT Roles and Responsibilities
 1. Explain AK-EMT roles and responsibilities within the EMS system.
 2. Contrast the roles and responsibilities of ETT, EMT-1, EMT-2, EMT-3, AEMT, AK-AEMT and Paramedic levels in the EMS community (Use the Guide for Emergency Medical Services Certification & Licensure)
 3. Alaska/Local Special Situations/Reports/Incident Reporting
 - a) Overview of AURORA ePCR program
- B. Who needs a Medical Director?
 1. Most EMS systems have a physician medical director who authorizes providers to give medical care in the field.
 - a) EMT-II, EMT-III, AEMT, Paramedics, and advanced life support services must all have a physician sponsor in order to provide advanced level or invasive care.
 - b) Specified skills in the EMT-I scope of practice require a physician sponsor.
- C. Medical Legal (Review)
 1. Alaska Advance Directives
 - a) Do Not Resuscitate (DNR) orders
 - 1) Patient has the right to refuse resuscitative efforts.
 - 2) In general, requires written order from physician.
 - 3) Review state and local legislation/protocols relative to DNR orders and advance directives.
 - 4) When in doubt or when written orders are not present, the AEMT should begin resuscitation efforts.
 2. Special Situations
 - a) Donor/organ harvesting consideration
 - 1) Requires a signed legal permission document
 - (a) Separate donor card
 - (b) Intent to be a donor on the reverse of patient's driver's license
 - 2) A potential organ donor should not be treated differently from any other patient requesting treatment.
 - 3) EMT-Basic's role in organ harvesting
 - (a) Identify the patient as a potential donor.

- (b) Establish communication with medical direction.
 - (c) Provide care to maintain viable organs.
- 3. Alaska Special Reporting Situations
 - a) Established by state legislation and may vary from state to state
 - b) Alaska Statutes and Regulations regarding reporting
 - 1) AS 08.64.369. Health care professionals to report certain injuries.
 - (a) <http://www.akleg.gov/basis/statutes.asp#08.64.369>
 - 2) AS 47.17.010 Reporting child abuse and neglect
 - (a) <http://www.akleg.gov/basis/statutes.asp#47.17.010>
 - 3) AS 47.24.010. Persons required to report; reports of harm (Vulnerable Adult)
 - (a) <http://www.akleg.gov/basis/statutes.asp#47.24.010>
 - (b) Elderly
 - (c) Mentally incapacitated
 - 4) 7 AAC 16.010 Do-not-resuscitate Protocol and Identification
 - (a) <http://www.akleg.gov/basis/aac.asp#7.15>
 - 5) AS 13.52.060(j) Do not resuscitate protocol and identification requirements
 - (a) <http://www.akleg.gov/basis/statutes.asp#13.52.060>
 - 6) AS 47.10.013(c) Safe Surrender
 - (a) <http://www.akleg.gov/basis/statutes.asp#47.10.013>

Lesson 2: Principles of Pharmacology (8 hrs)

Objectives

- 2.1 Recall the 6 “rights” of medication administration:
 - a. Right Patient
 - b. Right Medication
 - c. Right Dose
 - d. Right Route
 - e. Right Time
 - f. Right Documentation
- 2.2 For each of the Alaska AEMT medications give the following:
 - a. Generic name
 - b. Trade name
 - c. Classification
 - d. Drug Action
 - e. Indications
 - f. Contraindications
 - g. Side Effects
 - h. Precautions
 - i. How supplied
 - j. Dose: Adult/pediatrics
 - k. Routes of administration
- 2.3 Describe reconstitution (e.g., Glucagon) or admixture (e.g., TXA) of medications for administration.
- 2.4 Describe the medication administration considerations that must be applied to special populations, including pediatric, geriatric, and pregnant patients.
- 2.5 Given a patient scenario, state and/ or demonstrate the correct drug, dosage, and administration route(s) for Alaska AEMT medications: :
 - a. Atropine

- b. Adenosine
- c. Benzodiazepine-seizures only
- d. Diphenhydramine
- e. Epinephrine 1mg/1 ml SQ for asthma and anaphylaxis
- f. Epinephrine 1mg/10ml IV for Cardiac Arrest
- g. Ketamine- Excited delirium only
- h. Magnesium Sulfate- asthma, eclampsia, torsade's de pointe only
- i. Ondansetron

Psychomotor Objectives:

- 2.6 Demonstrate understanding of the 6 "rights" of medication administration
- 2.7 Demonstrate bolus drug dose calculations, including volume to be administered, confirming with a double-check system
- 2.8 Demonstrate withdrawal of medication from an ampule, vial (single dose or multi-dose), and assembly of prefilled syringes
- 2.9 Demonstrate, given a patient scenario, the correct drug, dosage and administration route(s) of the AK AEMT medications

Lesson Content

- A. Administration of Medication to a Patient
 - 1. The "Rights" of Drug Administration
 - a) Right Patient
 - b) Right Medication
 - c) Right Dose
 - d) Right Route
 - e) Right Time
 - f) Right Documentation
 - 2. Drug Dose Calculations
 - a) System of weights and measures
 - b) Drug calculations
 - 1) Desired dose
 - 2) Concentration on hand
 - 3) Volume on hand
 - c) Calculate
 - 1) Volume based bolus
 - 2) IV drip rate
 - 3) Medication drip rate
 - 3. Review Techniques of Medication Administration (Advantages, Disadvantages, Techniques)
 - a) Peripheral venous cannulation
 - b) intraosseous
 - c) Intramuscular (manual)
 - d) Subcutaneous (manual)
 - e) Aerosolized
 - f) Nebulized
 - g) Sublingual
 - h) Intranasal

4. Reassessment
 - a) Data - Indications for medication
 - b) Action - Medication administered
 - c) Response - Effect of medication
5. Documentation

Drug Profiles

The student will develop a drug profile for the following emergency medications allowed by the Alaska OEMS for administration by the AK-AEMT in Alaska . Sample drug information cards and other supporting materials are available in the Alaska EMS instructor reference repository.

MEDICATION	RESTRICTIONS
AK- AEMT (Not Part of NAEMT Curriculum)	
*Adenosine	
*Benzodiazepines	Seizures Only
Ativan (Lorazepam)	
Valium)(Diazepam	
Versed (Midazolam)	
*Ketamine	excited delirium only
*Magnesium Sulfate	asthma, eclampsia, torsades de pointe
The Following are Alaska EMT 2-3 Meds	
Narcan (EMT-2)	
*TXA (Tranexamic Acid) (EMT-2)	
*Diphenhydramine (EMT-2)	
Glucagon (EMT-2)	
Nitrous Oxide (EMT-2)	
*Ondansetron (Zofran) (EMT-2)	
*Antiarrhythmic (EMT-3)	
Amiodarone	
Lidocaine	
*Atropine (EMT-3)	
*Fentanyl (EMT-3)	
*Morphine Sulfate (EMT-3)	
*Epinephrine 0.1mg/ml (EMT-3)	Cardiac Arrest only

***AK-AEMT Specific Medications**

Each drug profile shall contain the following information:

1. Generic name
2. Trade name
3. Classification
4. Drug Action
5. Indications
6. Contraindications
7. Side Effects
8. Precautions
9. How supplied
10. Dose: Adult/pediatrics
11. Routes of administration

Lesson 3: Pain Management (2 hrs) –

Objectives

At the completion of this section the student will

- 3.1 Conduct pain assessment appropriately by patient's age
- 3.2 Discuss the symptoms of pain
- 3.3 Discuss non-pharmacological and pharmacological pain management options.
- 3.4 Determine the differences between acute and chronic pain management
- 3.5 Discuss the benefits of each medication:
 - a. Morphine
 - b. Fentanyl
- 3.6 Explain the importance of considering
 - a. Anti-emetics (Ondansetron)
 - b. Narcotic antagonists (Naloxone)
- 3.7 Analyze the value of QA/QI, medical direction involvement, documentation of pain management.
- 3.8 Outline monitoring and documentation techniques during various phases of pain management.
- 3.9 Critique the position paper published by the National Association of EMS Physicians regarding Prehospital Pain Management

Psychomotor Objectives:

- 3.10 Demonstration of non-medication pain management treatment
- 3.11 Demonstration of pain medication administration

Lesson Content

- A. Pain Assessment
- B. Adequate pain control is not routinely provided for several reasons
 1. Most common- underestimation of patient's needs
 2. EMS personnel may base their judgement on past, similar patients.
 3. Relief from Pain is a basic human right
 4. Adequate pain relief is known to minimize anxiety and cardiac complications
 5. Prehospital protocols should require:
 - a) Assessment of pain severity
 - b) Reassessment of pain level after every intervention
 - c) Document every intervention
- C. Tools for pain assessment
 1. Use the same scale to assess and reassess
 2. Interpretation of the signal includes the following dimensions:
 - a) Physiologic
 - b) Psychological
 - c) Emotional
 - d) Behavioral
 3. Assessment instrument - document
 - a) Presence of pain

- b) Intensity of pain
 - c) Change in pain severity with time and treatment
- 4. Types of scales
 - a) Numeric Rating Scale
 - 1) "Rate your pain on a scale of 0-10"
 - 2) Proven more reliable in trauma
 - b) Graphic Scale
 - 1) Commonly used in pediatric patients
- D. Clinical protocols for prehospital pain management
 - 1. Careful use of appropriate wording
 - 2. Distraction away from painful stimuli
 - 3. Parents' presence typically reduces the level of distress in infants and children
 - 4. Traditional interventions should be provided, for example:
 - a) Immobilization of fractures
 - b) Elevation
 - c) Ice
 - d) Compression
 - e) Padding of spinal immobilization.
- E. Pharmacological Interventions for pain management
 - 1. Narcotics
 - a) Morphine
 - b) Fentanyl
 - 2. Over the Counter Medications
 - a) ibuprofen
 - b) acetaminophen
- F. Adverse effects and benefits of opioid pain medications
 - 1. Morphine
 - 2. Fentanyl
- G. Complications and Management
 - 1. CNS Effects
 - a) Respiratory depression
 - 2. Gastrointestinal Effects
 - a) Nausea and Vomiting
 - 3. Management
 - a) Narcotic antagonists (Naloxone)
 - b) Anti-emetics (Ondansetron)
- H. Monitoring and Documentation before and after analgesic administration
 - 1. Documentation of the patient's clinical status before and after analgesic administrations is required
 - 2. Vital Signs
 - a) Level of consciousness
 - b) HR, BP, pulse, pulse oximetry, etc.
 - 1) Baseline
 - 2) Following each intervention
 - 3. Document
 - a) Any significant change in clinical status
 - b) Any corrective action taken

4. Follow all local controlled substances policies for documentation, wastage, storage, etc.
- I. Quality improvement and medical oversight
1. Systems with established QI programs have better compliance to pain management protocols.
 - a) Establish benchmarks
 - b) Tracking plan
 - c) Feedback and discussion with ED staff, medical director, patients
- J. Acute vs chronic pain management
1. Dependence, abuse, and addiction of prescribed medications is well documented.
 2. Perform a thorough pain assessment prior to providing treatment
 3. Pain management should depend on objective clinical decision making
 4. Pain is individualized with each patient.
 - a) When patients report where their level of pain is, it should not be influenced by the provider's bias
- K. Sedation Monitoring
1. Reference: ACEP-Out-of-hospital Use of Analgesia and Sedation (see Appendix A)
 - a) Analgesia
 - 1) Use of NSAIDs and acetaminophen with opioids
 - 2) Fentanyl as an "ideal narcotic agent"
 - 3) Misplaced fear of clouding ultimate diagnoses when using analgesia
- L. Pediatric pain management
1. Reference: "ACEP-Reducing Pediatric Pain and Anxiety" (see appendix A)
 - a) Optimizing the environment
 - 1) Combat anxiety and reduce pain by improving the physical environment
 - 2) Assessing pain
 - (a) Self-reporting pain scale examples:
 - (1) Wong-Baker FACES[®]
 - (2) FACES and FACES revised
 - (3) OUCHER[®]
 - (b) Non-self-reporting pain scale example
 - (1) FLACC Scale- Faces, legs, Activity, Cry, Console
 - (2) Utilizes presenting history and physical exam
 2. Non-invasive pain management
 - a) Multidisciplinary/complimentary method
 - b) Distraction
 3. Systemic Analgesia and Anxiolysis
 - a) Oral/liquid medications are usually sufficient
 - 1) NSAIDs and some opiate formulations
 - b) Intranasal
 - c) Less intrusive
 - d) Efficient
 - e) Easy and quick
 - f) Effective route for analgesia and anxiolysis
- M. Neo-natal pain management
1. Reference: ACEP-Reducing Pediatric Pain and Anxiety

- a) Physiologic awareness of medication use in children less than six months (neonates)
 - 1) Most analgesics conjugate in the liver
 - 2) Enzymes for drug metabolism develop for up to six months
 - 3) Higher percentage of weight/less fat
 - (a) Water soluble drugs distribute greater volumes in neonates
 - 4) Topical anesthesia
 - (a) Requires appropriate dosing to prevent systemic toxicity
 - (b) No prolonged exposure

Lesson 4: Respiratory Emergencies (1 hr : primarily review and add medications)

Objectives

- 4.1 Discuss pathophysiology of Respiratory Emergencies.
- 4.2 Differentiate between respiratory distress and respiratory failure added.
- 4.3 Review when to oxygenate and when to ventilate a patient.
- 4.4 Understand acute upper airway disorders signs and symptoms.
- 4.5 Describe the management of upper and lower airway emergencies.
- 4.6 Describe the difference between obstructive and reactive pulmonary diseases.
- 4.7 **Psychomotor Objectives**
- 4.8 Demonstration how to setup assist a patient with the administration of a small volume nebulizer.
- 4.9 Demonstrate the ability to know when and how to administer magnesium sulphate for server asthma

Lesson Content

- A. Pathophysiology
 1. Respiratory Distress vs Respiratory Failure
 2. Obstructive / Restrictive/ Reactive Lung Diseases
 - a) Emphysema
 - 1) changes in respiratory tract
 - 2) changes in gas exchange
 - 3) long term effects
 - 4) decompensated states
 - b) Chronic Bronchitis
 - 1) changes in respiratory tract
 - 2) changes in gas exchange
 - 3) long term effects
 - 4) decompensated states
 - c) Asthma
 - 1) changes in respiratory tract
 - 2) changes in gas exchange
 - 3) long term effects
 - 4) decompensated states

3. Infectious Lung Disease
 - a) Pneumonia
4. Pediatric Respiratory Illnesses
 - a) RSV
 - b) Bronchiolitis
 - c) Croup
- B. Impact of Disease on Prehospital Assessment
 1. Pertinent historical questions
 2. Pertinent physical findings
 - a) Breath sounds
 - 1) coarse crackles
 - 2) fine crackles
 - 3) rhonchi
 - 4) wheezes
 - 5) diffuse
 - 6) continuous
 - 7) stridor
 - 8) pleural rub
 - b) Inspiratory vs. Expiratory ratios
- C. Findings Associated with Specific Diseases:
 1. Upper Respiratory Infection
 2. Epiglottitis
 3. Croup
 4. Emphysema
 5. Chronic Bronchitis
 6. Asthma
 7. Pneumonia
- D. Age-Related Considerations:
 1. Pediatrics
 - a) Variations in symptomatology
 - b) Variations in physical presentation
 - c) Asthma
 - d) Types of pneumonia
 2. Geriatrics
 - a) Variations in symptomatology
 - b) Variations in physical presentation
- E. Management
 1. Oxygenation and Ventilations Requirements
 2. Use of Inhaled Beta-Agonists
 - a) MDI
 - b) Nebulizer
 3. CPAP
 4. Magnesium Sulfate (Asthma Only)
 5. IV Fluid Therapy in Respiratory Illness
- F. Age-Related Considerations
 1. Pediatrics
 - a) Variations in symptomatology

- b) Variations in physical presentation
 - 1) Asthma
 - 2) Types of pneumonia
 - c) Dosage considerations
 - d) Fluid considerations
 - 2. Geriatrics
 - a) Drug interaction considerations
 - b) Fluid considerations
- G. Communication and documentation

Lesson 5: Cardiovascular Emergencies (8-12 hours)

Lesson Objectives

- 5.1 Review the electrical and conductive system of the heart
- 5.2 Review and understand the following cardiac syndromes and their management
 - a. Angina Pectoris/Acute Coronary Syndrome
 - b. Acute Myocardial Infarction
 - c. Irregularity of Pulse
 - d. Heart failure
 - e. Cardiogenic shock
- 5.3 Review of atypical presentations of myocardial infarction
- 5.4 Effectively manage hemodynamic instability in the syndromes listed in 9.13 a.
- 5.5 Make appropriate treatment choices based on the cause of cardiac arrest
- 5.6 Determine the appropriate destination for your cardiac emergency patient
- 5.7 Compare the difference between heart failure and cardiogenic shock
- 5.8 Review the management of heart failure, cardiogenic shock, and cardiac arrest
- 5.9 Discuss when termination of resuscitation is an option.

Psychomotor Objectives:

- 5.10 Demonstrate how to assess and provide emergency medical care for a patient with chest pain or discomfort.
- 5.11 Demonstrate the administration of chest pain medications to include aspirin, nitroglycerine, and opioid pain medication.
- 5.12 Demonstrate how to perform maintains of an AED and manual defibrillator.
- 5.13 Demonstration how to perform CPR while incorporating the use of a manual defibrillator

Lesson Content

- A. Review anatomy of heart-
 - 1. Electrical and conduction system
 - a) Myocardial muscle cells
 - b) Specialized electrical cells
 - c) Automaticity
 - d) Autonomic Control
 - 1) Sympathetic
 - 2) parasympathetic
- B. Physiology
 - 1. Cardiac Cycle
 - a) Systole

- b) Diastole
- C. Rhythm Interpretation
 - 1. Three Lead Review
 - a) Intrinsic Pacer Sites
 - b) P Waves
 - c) PR Interval
 - d) QRS Complex
 - e) Q-Waves
 - f) Normal Ventricular Conduction
 - g) ST-Segment
 - h) QT-Segment
 - i) T Wave
 - 2. Rhythms
 - a) normal/regular sinus rhythm (NSR/RSR);
 - b) sinus bradycardia;
 - c) unstable symptomatic bradycardia of any origin;
 - d) sinus tachycardia;
 - e) unstable symptomatic tachycardia of any origin;
 - f) ventricular tachycardia;
 - g) ventricular fibrillation;
 - h) asystole;
 - i) pulseless Electrical Activity (PEA);
 - j) premature Ventricular Complexes (PVCs);
 - k) third degree AV block (complete heart block);
 - l) agonal rhythm; and
 - m) pacemaker rhythms.
- D. Angina Pectoris/Acute Coronary Syndrome
 - 1. Epidemiology
 - 2. Precipitating Causes
 - a) Atherosclerosis
 - b) Vasospastic (Prinzmetal's)
 - c) Medications
 - 1) Aspirin
 - 2) Nitroglycerine
 - 3) Opioid pain medication
 - 3. Morbidity/mortality
 - a) Not a self-limiting disease
 - b) Chest pain may dissipate, but myocardial ischemia and injury continue
 - c) A single anginal 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
 - 1) Defined as a brief discomfort, has predictable characteristics and is relieved promptly - no change in this pattern
 - 2) Stable
 - (a) occurs at a relative fixed frequency

- (b) usually relieved by rest and/ or medication
 - 3) Unstable
 - (a) occurs without fixed frequency
 - (b) may or may not be relieved by rest and/ or medication
 - 4) Initial - first episode
 - 5) Progressive - accelerating i n frequency and duration
 - 6) Pre-infarction angina
 - (a) pain at rest
 - (b) sitting or lying down
- 4. Review Primary Survey findings
 - a) Airway/ breathing
 - 1) Labored breathing may or may not be present
 - b) Circulation
 - 1) Peripheral pulses
 - (a) quality
 - (b) rhythm
 - 2) Peripheral perfusion
 - (a) changes in skin color
 - (b) changes in skin temperature
 - (c) changes in skin moisture
- 5. History of Present Illness/Sample History
 - a) Chief complaint
 - 1) Typical - sudden onset of discomfort, usually of brief duration, lasting three to five minutes, maybe five to 15 minutes; never 30 minutes to 2 hours
 - 2) Typical - usually relieved by rest and/ or medication
 - 3) Epigastric pain or discomfort
 - 4) Atypical
 - b) Denial
 - c) Contributing history
 - 1) Initial recognized event
 - 2) Recurrent event
 - 3) Increasing frequency and/or duration of event
- 6. Secondary-Survey Findings
 - a) Airway
 - b) Breathing
 - 1) May or may not be labored
 - 2) Breath sounds
 - 3) May be clear to auscultation
 - 4) May be congested in the bases
 - c) Circulation
 - 1) Alterations in heart rate and rhythm may occur
 - 2) Peripheral pulses are usually not affected
 - 3) Blood pressure may be elevated during the episode and normalize afterwards
- 7. Management
 - a) Refer to American Heart Association guidelines
 - 1) Scope of Practice includes
 - 2) Oxygen

- 3) Aspirin
- 4) Nitroglycerin
- 5) Morphine/Fentanyl or Nitrous oxide
- b) Rapid transport
 - 1) Sense of urgency for reperfusion
 - 2) No relief with medications
 - 3) Hypotension/ hypoperfusion with CNS involvement
- E. Acute Myocardial Infarction- emphasis on treatment with Alaska SOP medication
 - 1. Epidemiology
 - 2. Precipitating Causes (as With Angina)
 - a) Atherosclerosis
 - b) Persistent angina
 - c) Occlusion
 - d) Non-traumatic- Toxin (such as cocaine, amphetamines, and inhalants)
 - 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
 - 1) Peripheral pulses
 - (a) quality
 - (b) rhythm
 - 2) Peripheral perfusion
 - (a) changes in skin color
 - (b) changes in skin temperature
 - (c) changes in skin moisture
 - 5. History of the Present Illness/Sample History
 - 6. Chief complaint
 - a) Typical onset of discomfort, usually of long duration, over 30 minutes
 - b) Typically, unrelieved by rest and/ or nitroglycerin preparation
 - c) Epigastric pain or discomfort
 - d) Atypical
 - e) Contributing history
 - 1) First time
 - 2) Recurrent
 - 3) Increasing frequency and/ or duration
 - f) Denial
 - 7. Secondary Survey Findings
 - a) Airway
 - b) Breath sounds
 - 1) May be clear to auscultation
 - 2) Congestion in bases may be present
 - c) Circulation
 - 1) Skin

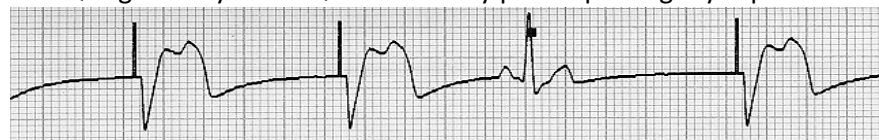
- (a) pallor during the episode
 - (b) temperature may vary
 - (c) diaphoresis is usually present
 - 2) Alterations in heart rate and rhythm may occur
 - 3) Peripheral pulses are usually not affected
 - 4) Blood pressure may be elevated or lowered
 - 8. Management
 - a) Refer to American Heart Association guidelines
 - 1) Scope of Practice includes
 - (a) Oxygen
 - (b) Aspirin
 - (c) Nitroglycerin
 - (d) Morphine/Fentanyl or Nitrous oxide
 - 9. Transport
 - a) Criteria for rapid transport
 - 1) No relief with medications
 - 2) Hypotension/ hypoperfusion with CNS involvement
- F. Irregularity of Pulse
- 1. Epidemiology
 - a) Autonomic Nervous System
 - 1) Helps regulates rate and strength of contractions
 - 2) Sympathetic
 - 3) Parasympathetic
 - b) Sympathetic Stimulation
 - 1) Nerves arise in thoracic and lumbar ganglia
 - 2) Innervate both atria and ventricles
 - 3) Receptor sites:
 - 1) Alpha
 - 2) Beta
 - 4) Effects heart by
 - (a) Increasing pacemaker firing
 - (b) Increasing spread of impulse conduction through heart
 - (c) Increases force of contractions
 - (d) Vasodilates Coronary arteries
 - c) Parasympathetic Stimulation
 - 1) Vagal Nerve
 - 2) Primarily Innervates atria but some fibers in the ventricles
 - 3) Effects heart by
 - (a) Decreased firing rate of SA node
 - (b) Decreased AV conduction
 - d) Precipitating Causes
 - 2. Management -Ventricular Tachycardia with a pulse or SVT
 - a) O₂
 - b) Monitor Vitals
 - c) Establish IV
 - d) Obtain a 12-Lead if possible
 - e) Vagal stimulation

- f) Synchronized Cardioversion, if unstable
 - 1) Indications for Synchronized Cardioversion
 - (a) SVT or VT at a rate of greater than 150 bpm AND
 - (b) Significant signs and symptoms
 - g) Chest Pain
 - h) Hypotension
 - i) Respiratory distress (SOA, Pulmonary Edema)
 - j) Syncopal episode
 - k) Cyanosis
 - l) Diaphoresis
 - 1) Cardioversion vs defibrillation
 - (a) Cardioversion terminates reentry loops/ synchronized shock
 - (b) Defibrillation terminates fibrillation by depolarizing the entire fibrillating myocardium /unsynchronized shock
 - (c) Synchronized shock delivers the shock a few milliseconds after the peak of the R-wave
 - 2) Procedure:
 - (a) Establish IV access and provide sedation if patient is conscious; do not delay cardioversion
 - (b) Consider Medication if time allows
 - (1) Morphine 2-4mg IV if blood pressure allows or Fentanyl 50-100 mcg IV
 - (c) Prepare suction, airway management equipment
 - (d) Apply 4-lead electrodes
 - (e) Apply Defib electrodes- usually (-) left anterior and (+) left posterior
 - (f) Press the "Sync" button on machine
 - (g) Verify that the sync dots are:
 - (1) Clearly visible on the R wave
 - (2) Consistent from beat to beat
 - (h) If not- try switching leads or increasing EKG size
 - (i) Select energy level: Dependent on rhythm- follow AHA ACLS recommendations
 - (j) Press the charge button
 - (k) Check to ensure all are clear
 - (l) Press and hold the shock button until discharge occurs; machine will not shock until just after the peak of the R-wave. If you release the shock button too quickly, no shock will be delivered.
 - (m) If tachycardia persists, increase energy and reset the sync button before charging again
 - 3) Support and communications strategies
 - 4) Complications:
 - (a) Pain from deliver of the shock
 - (b) Skin burns due to inadequate contact between paddles and skin
 - (c) Rescuer defibrillation due to contact with stretcher or patient
3. Management-Slow heartrate with symptoms
- a) O2
 - b) Monitor Vitals
 - c) Establish IV

- d) Obtain a 12-Lead if possible
- e) Administer atropine if indicated
- f) Transcutaneous Pacing, if unstable
 - 1) Delivers a shock causing depolarization and contraction of the myocardium
 - 2) No risk of electrical injury to providers. Delivers less than 1/1000 the energy used in defibrillation.
 - 3) Indications:
 - (a) Symptomatic bradycardia (use Transcutaneous Pacing for bradycardias not responsive to oxygen, ventilation, and atropine.
 - (b) Significant signs and symptoms include:
 - (1) BP < 80 systolic
 - (2) Chest pain
 - (3) Altered mental status
 - (4) Pulmonary edema
 - 4) Contraindications:
 - (a) Bradycardia due to severe hypothermia
 - 5) Precautions:
 - (a) Most bradycardia in children results from hypoxia or hypoventilation and responds to adequate airway and ventilation interventions.
 - 6) Procedure:
 - (a) Consider pain management
 - (b) Apply defib electrodes, generally (1) left anterior, (+) left posterior.
 - (c) Apply fur-lead electrodes.
 - (d) Change Defibrillator settings to "Pacer"
 - (e) Most machines have preset Energy and Rate setting. i.e. Zoll E Series is preset at Energy: 30 mAmps; Rate: 70 BPM. Know your machine and follow local Standing orders for setting or most current AHA ACLS recommendations.
 - (f) Slowly increase current 10 mAmps at a time, check for capture. If no capture, increase current 10 mAmps every 10-15 seconds until capture of 200 mAmps.



- (g) A wide QRS generally and a QRS after every pacer spike signify capture:



- (h) Set pacer to the lowest output required to maintain capture, usual 2-10 mAmps above the capture threshold.
- (i) Verify pulse and check blood pressure.
 - (1) Check femoral pulse.
 - (2) Muscle twitch due to pacing may be mistaken for caotid or left radial pulse
- 7) Adverse Effects:
 - (a) Muscle tremors
 - (b) Diaphragmatic stimulation
 - (c) VF and VT are rare complications. Treat according to protocol.

- (d) CPR is safe during pacing, You may feel a mild shock if you make direct contact with defib pads.

G. Heart failure

1. Pathophysiology of CHF
 - a) May refer to right or left side heart failure
 - b) No valves between left atria and lungs
 - 1) May allow fluid backup
2. Precipitating causes
 - a) Increased peripheral vascular resistance (PVR)
 - 1) Chronic hypertension
 - (a) Increased left ventricular workload
 - (b) Hypertrophy/cardiomegaly
 - (c) P mitral (seen with left atrial enlargement)
 - 2) Chronic COPD
 - 3) Pulmonary emboli
 - 4) Non-compliance with medications
 - b) Ventricular failure
 - 1) Myocardial Infarction
 - (a) AMI
 - (b) Previous MI with ventricular involvement
 - (c) Non-compliance with medications
 - c) Fluid overload
 - 1) Non-compliance with medications
 - 1) Renal Failure
 - d) Presentation/Signs/Symptoms of CHF
 - 1) Distended neck veins
 - 2) Peripheral edema
 - (a) Can be pitting (late sign)
 - 3) Difficulty breathing
 - (a) Crackles and wheezes in dependent portions of the lungs
3. Management
 - a) Continuous Positive Airway Pressure (CPAP)
 - 1) Positive end expiratory pressure
 - 2) Forces alveoli open and helps keep them open
 - (a) Forces fluid out of alveoli
 - (b) Increases oxygenation
 - 3) Contraindications
 - (a) Inability for the patient to maintain their own airway
 - (b) Hypotension (systolic BP of 90mm/Hg or less) may be a contraindication.
Follow local protocol or guidelines
 - (c) Recent esophageal surgery
 - b) Nitroglycerin
 - 1) Peripheral vasodilator
 - 2) Reduces oxygen demand in the heart
 - 3) Dilates coronary arteries
 - 4) Contraindications
 - (a) Hypotension (systolic BP of 90mm/Hg or less)

- (b) Use of phosphodiesterase inhibitors in the past 24-48 hours (e.g., Cialis[®], Viagra[®])

H. Cardiac Arrest and Resuscitation

1. Ethical Issues in Resuscitation
 - a) Withholding Resuscitation Attempts
 - 1) Irreversible death
 - 2) Do Not Resuscitate (DNR) orders
 - b) Provide Emotional Support for Family
 - b) Organ and Tissue Donation
2. Cardiac Arrest
 - a) Pathophysiology
 - 1) If the heart stops contracting, no blood will flow.
 - 2) The body cannot survive when the heart stops.
 - (a) Organ damage begins quickly after the heart stops.
 - (b) Brain damage
 - (1) begins 4-6 minutes after the patient suffers cardiac arrest.
 - (2) becomes irreversible in 8-10 minutes.
 - b) Cardio-pulmonary resuscitation (CPR)
 - 1) Artificial ventilation
 - 2) External chest compressions
 - 3) Oxygenated blood is circulated to the brain and other vital organs
 - c) General Reasons for the Heart to Stop Beating
 - 1) Sudden death and heart disease
 - 2) Breathing stops, especially in infants and children
 - 3) Medical emergencies
 - 4) Trauma
 - 5) Medical conditions (for example)
 - (a) End Stage Renal Disease
 - (b) Hyperkalemia with renal disease
3. Management
 - a) Related terminology
 - b) Indications for WITHHOLDING resuscitation efforts
 - c) Advanced airway management and ventilation
 - d) Circulation
 - e) IV therapy as appropriate
 - f) Refer to current AHA ACLS guidelines for treatment
 - g) Rapid transport
4. Support and communications strategies
 - a) Explanation for patient, family, significant others
 - b) Communications and transfer of data to the physician
5. Termination of resuscitation efforts
 - a) Inclusion criteria
 - b) Criteria NOT to be considered as inclusionary or exclusionary
6. Resuscitation
 - a) System Components to Maximize Survival
 - b) Early access
 - 1) Public education and awareness

- 2) rapid recognition of a cardiac emergency
 - 3) rapid notification before CPR starts - "phone first"
 - 4) 911-pre-arrival instructions and dispatcher directed CPR
 - c) Early CPR
 - 1) Lay public
 - 2) family
 - 3) bystanders
 - 4) Emergency Medical Responders
 - d) Early Defibrillation
 - e) Early Advanced Care
 - f) Basic Cardiac Life Support (Refer to Current American Heart Association Guidelines)
 - 1) Adult CPR and foreign body airway obstruction
 - 2) Child CPR and foreign body airway obstruction
 - 3) Infant CPR and foreign body airway obstruction
 - 4) Neonatal sequence
 - 5) Alternative CPR techniques -- Interposed abdominal compression
 - g) Airway Control and Ventilation
 - 1) Airway adjuncts
 - 2) Basic adjuncts
 - 3) Advanced adjuncts (as defined by Scope of Practice)
 - h) Ventilation
 - 1) Hazards of over-ventilation
 - (a) reduces blood return to the right side of the heart
 - (b) reduces the overall blood flow that can be generated with CPR
 - 2) Devices to assist ventilation
 - i) Chest Compressions
 - 1) Factors which decrease effectiveness
 - (a) Compression that are too shallow
 - (b) Slow compression rate
 - (c) Sub-maximum recoil
 - (d) Frequent interruptions
 - 2) Devices to assist circulation
 - (a) Active compression-decompression CPR
 - (b) Impedance threshold device
 - (c) Mechanical piston device
 - (d) Load-distributing band or vest CPR
 - j) Automated and Manual External Defibrillation (AED) -- (Refer To Current American Heart Association Guidelines)
 - 1) Adult Sequence
 - 2) Child Sequence
 - 3) Infant Sequence
 - 4) Special Situations
 - (a) Pacemaker/implanted cardioverter/defibrillator
 - (b) Wet patients
 - (c) Transdermal medication patches
 - k) Advanced Life Support - Refer to the Current American Heart Association Guidelines
7. Post-Resuscitation Support - Refer to the Current American Heart Association Guidelines

- a) Return of Spontaneous Circulation (ROSC)
 - 1) Temperature regulation
 - (a) Induced hypothermia
 - 2) Glucose control
 - 3) Organ specific support
 - (a) Respiratory system
 - (1) ventilation rates
 - (b) Cardiovascular system
 - (1) monitor
 - (2) leave AED pads in place
 - 4) Special Considerations
 - (a) Ventricular Assist Devices

Lesson 6: Neurology (2 hrs)

Lesson Objectives

- 6.1 Explain signs, symptoms and management of the following neurologic emergencies
 - a. Seizures
 - b. Toxemia of pregnancy
- 6.2 List age-related variation to assessment and management of the following neurologic emergencies.
 - a. Seizures
 - b. Toxemia of pregnancy

Lesson Content

- A. Seizures
 - 1. Types of Seizures
 - a) Generalized
 - b) Tonic-clonic
 - c) Absence
 - d) Partial
 - e) Simple
 - f) Complex
 - 2. Status epilepticus
 - a) A continuous seizure lasting more than 30 minutes
 - b) Two or more seizures without regaining consciousness between any of them
 - c) Prolonged seizures last between 5-30 minutes- should be treated as status epilepticus
 - d) Complications:
 - 1) Aspiration
 - 2) Bone and spine fractures
 - 3) Brain damage from lack of oxygen and/or depletion of glucose
 - 4) Dehydration
 - b) Causes
 - 1) Medication non-compliance
 - 2) Rapid increase in body temperature (febrile)
 - 3) AEIOU-TIPPSS

- (a) Alcohol
 - (b) Epilepsy
 - (c) Insulin (diabetic condition)
 - (d) Oxygen (lack of)
 - (e) Uremia (Kidney failure)
 - (f) Trauma
 - (g) Infection
 - (h) Psychiatric
 - (i) Poisoning (including drug overdose)
 - (j) Shock
 - (k) Stroke
- 4) Incidence
- 5) Assessment Findings
- (a) Spasms, muscle contractions
 - (b) Bite tongue, increased secretions
 - (c) Sweating
 - (d) Cyanosis
 - (e) Deviated gaze, facial or limb twitching, blinking, lip smacking
 - (f) Abnormal behavior
 - (g) Unconscious gradually increasing level of consciousness
 - (h) May shaking or tremors and no loss of consciousness
 - (i) Incontinent
 - (j) Persistent coma
 - (k) Altered autonomic function
 - (l) confusion
 - (m) Amnesia of event
- 6) Management
- (a) Safety of patient/position
 - (b) ABCs, consider nasopharyngeal airway
 - (c) Oxygen/suction
 - (d) Medications:
 - (1) Diazepam
 - (2) Lorazepam
 - (3) Midazolam
 - (e) Pulse oximetry
 - (f) Emotional support
- 7) Pregnancy Induced Hypertension (PIH) or Pre-eclampsia
- (a) Pregnancy related hypertension
 - (b) This generally develops at greater than 20 weeks' gestation and is indicated if BP is >140 systolic or >90 diastolic
 - (c) Additional signs and symptoms include:
 - (1) Patient may present with swollen face, hands, and feet
 - (2) Headache is common finding
 - (3) Nausea, vomiting, and anxiety may also be present
 - (d) Condition is serious as it may cause mother to have seizures (Eclampsia) or CVA

- (e) Seizures may extend to status seizures and fetus may suffer hypoxia as mother's SPO2 levels fall
- (f) Treatment of PIH/Eclampsia
 - (1) Maintain calm atmosphere
 - (2) Avoid bright lights and loud noises
 - (3) Monitor and support SpO2
 - (4) Establish IV access
 - (5) Consider Magnesium Sulphate per your protocol
 - (6) If patient seizes, assure that she does not injure herself
 - a. Aggressively attempt to maintain or establish airway
 - b. Immediate transport to higher level of care is required.
- 8) Eclampsia also presents in the post-partum stage
 - (a) ~20% of Eclampsia cases are post-partum and ~90% of those occur within the first week, though they may occur as late as four weeks after delivery
 - (b) Symptoms are the same as prenatal Eclampsia

Lesson 7: Psychiatric (Review) (2 hrs)

Objectives

- 7.1 Review the potential causes of behavioral emergencies, including organic and functional causes
- 7.2 Describe the assessment process for patients with psychiatric emergencies, including safety guidelines and specific questions to ask
- 7.3 Discuss risk factors that help indicate whether a patient may become violent
- 7.4 Discuss general management of a patient with psychiatric emergencies
- 7.5 Describe situations where restraint may be justified.
- 7.6 Describe methods used to restrain patients including both physical and chemical restraints
- 7.7 Explain the safe management of a potentially violent patient.

Psychomotor Objectives:

- 7.8 Demonstrate the technique used to mechanically restrain a patient.
- 7.9 Demonstration the administration of Ketamine and benzodiazepines as a chemical restraint.
- 7.10 Demonstration the assessment and care of a patient with agitated delirium.

Lesson Content

- A. Review causes of behavioral emergencies
 - 1. Organic
 - 2. Functional
- B. Define
 - 1. Behavior
 - 2. Psychiatric Disorder
 - 3. Behavioral Emergency
- C. Epidemiology of Psychiatric Disorders
- D. Assessment
 - 1. General Appearance
 - a) Dress
 - b) Grooming
 - c) Posture
 - d) Wringing of hands

- e) Facial grimaces
 - f) Mannerisms
 - g) Actions
 - h) Violence
2. Speech
 - a) Spontaneous or pressured
 - b) Slow or fast
 - c) Soft or loud
 - d) Understandable or not
 - e) Appropriate or inappropriate
 - 1) Mixed/confused words (word salad)
 - 2) Full words inappropriately used together
 - 3) Delusion
 3. Mood
 - a) Depressed
 - b) Euphoric
 - c) Manic
 - d) Anxious
 - e) Angry
 - f) Agitated
 - g) Fearful
 - h) Guilty
 4. Area of thought
 - a) Racing thoughts
 - b) Hallucinations
 - 1) Auditory
 - 2) Visual
 - 3) Somatic (strange body sensations)
 - c) Obsessive
 - d) Delusions (false beliefs)
 - e) Suicidal
 - f) Unconnected
 - g) Disturbed or distorted
 5. Posture/Gait
 6. Mental Status
- E. Behavioral Change
1. Factors that may alter a patient's behavior – May include Situational Stresses, Medical Illnesses, Psychiatric Problems, and Alcohol or Drugs
 2. Common Causes of Behavioral Alteration
 - a) Low blood sugar
 - b) Lack of oxygen
 - c) Hypoperfusion
 - d) Head trauma
 - e) Mind altering substances
 - f) Psychogenic - resulting in psychotic thinking, depression or panic
 - g) Excessive cold
 - h) Excessive heat

- i) Meningitis
 - j) Seizure disorders
 - k) Toxic ingestions-overdose
 - l) Withdrawal of drugs or alcohol
- F. Psychiatric Emergencies
1. Acute Psychosis
 - a) Assessment for Suicide Risk
 - 1) Depression
 - 2) Risk Factors/signs or symptoms
 - 3) Ideation or defined lethal plan of action which has been verbalized and/or written.
 - 4) alcohol and substance abuse
 - 5) purposelessness
 - 6) anxiety, agitation, unable to sleep or sleeping all the time
 - 7) feeling trapped, no way out, hopelessness
 - 8) withdrawal from friends, family, and society
 - 9) anger and/or aggressive tendencies
 - 10) recklessness or engaging in risky activities
 - 11) dramatic mood changes
 - 12) history of trauma or abuse
 - 13) some major physical illness (cancer, CHF, etc.)
 - 14) previous suicide attempt
 - 15) job or financial loss
 - 16) relational or social loss
 - 17) easy access to lethal means
 - 18) lack of social support and sense of isolation
 - 19) certain cultural and religious beliefs
 - b) Important questions
 - 1) How does the patient feel?
 - 2) Determine suicidal tendencies
 - 3) Is patient threat to self or others?
 - 4) Is there a medical problem?
 - 5) Is there trauma involved?
 - 6) Interventions?
 2. Management of Violent Patients
 - a) Scene Safety
 - b) Methods of Restraint
 - 1) Physical
 - (a) Attempt verbal de-escalation prior to physical restraint, if safe
 - (b) Provider safety first
 - (c) Determine the need for pharmacological restraint
 - (d) Restrain only those who can be overpowered with the physical forces available to you
 - (e) Five people should be available to apply full body restraint- one for each limb and one for restraint application
 - (f) Pre-plan each provider's role during restraint- know your communication signals or verbal cues.
 - (g) Swift, coordinated action is most effective

- (h) Talk to the patient continually
- (i) Do not remove restraints in the out-of-hospital setting
- (j) Thoroughly document restraints
- (k) Legal considerations: in law enforcement custody and age
- (l) Transportation
 - (1) Ensure continued ability to restrain
 - (2) Ensure adequate personnel and equipment
- (m) Principles of restraining motion:
 - (1) Understand normal range of motion
 - (2) Restrain range of motion
 - (3) Understand muscle groups
- (n) Patient Considerations
 - (1) Pregnant
 - (2) Pediatric
 - (3) Geriatric
- 2) Chemical restraint
 - (a) Indications
 - (1) Agitated Delirium Syndrome Only
 - (b) Requires continuous monitoring, assessment, and management
 - (c) Medication types
 - (1) Ketamine
 - (2) Benzodiazepines e.g. midazolam, lorazepam, diazepam
 - (d) Dosage
 - (1) Titrate dosage to level of agitation
 - (2) Combination therapy may be necessary
 - (3) Follow local protocols
 - (e) Medication routes
 - (1) IM
 - (2) Nasal Inhaler
- 3. Agitated Delirium Syndrome
 - a) Characterized by a sudden onset of extreme agitation and extremely irrational or combative behavior
 - 1) Bizarreness, aggressiveness, agitation, ranting, hyperactivity, paranoia, panic
 - 2) Reported to result from substance intoxication, psychiatric illness, alcohol withdrawal, head trauma or a combination of these.
 - 3) Patient may exhibit hypertension, tachycardia, diaphoresis, dilated pupils, tachypnea, abnormal tolerance to pain, hyperthermia, noncompliance, and endless endurance and strength.
 - 4) May lead to respiratory and cardiac arrest – restraints may increase the risk
 - b) Emergency medical care
 - 1) Scene size-up, personal safety
 - 2) Establish rapport
 - (a) utilize therapeutic interviewing techniques
 - (1) engage in active listening
 - (2) supportive and empathetic
 - (3) limit interruptions
 - (4) respect patient's territory, limit physical touch

- (b) avoid threatening actions, statements and questions
 - (c) approach slowly and purposefully
- 4. Patient assessment
 - a) intellectual functioning
 - b) orientation
 - c) memory
 - d) concentration
 - e) judgment
 - 1) thought content
 - 2) disordered thoughts
 - 3) delusions, hallucinations
 - 4) unusual worries, fears
 - f) language
 - 1) speech pattern and content
 - 2) garbled or unintelligible
 - g) mood
 - 1) anxiety, depression, elation, agitation
 - 2) level of alertness, distractibility
 - (a) appearance, hygiene, dress
 - (b) psychomotor activity
 - h) Pathophysiologic effects of Excited Delirium Syndrome
 - 1) Hypoxia
 - 2) Acidosis
 - 3) electrolyte derangement
 - 4) Rhabdomyolysis
 - 5) hyperthermia
- 5. Treatment
 - a) Calm the patient -do not leave the patient alone, unless unsafe situation; consider need for law enforcement
 - b) Restrain if necessary
 - c) Chemical Restraint
 - 1) Ketamine
 - d) Temperature Management
 - e) Maximize respiratory compensation
 - f) Search for treatable causes:
 - g) Transport
 - h) If overdose, bring medications or drugs found to medical facility.
- 6. Medical-Legal Considerations
 - a) Types of Restraints
 - b) Transport Against Patient Will
- 7. Consider Age-Related Variations for Pediatric and Geriatric Assessment and Management
 - a) Pediatric Behavioral Emergencies
 - 1) Teenage suicide concerns
 - 2) Aggressive behavior may be a symptom of an underlying disorder or disability
 - b) Geriatrics
 - 1) Delirium vs Dementia
 - 2) Alzheimers

Lesson 8: Shock (Basic Review with endpoint of administration of TXA) (2 hrs)

Objectives

- 8.1 Describe the physiology of perfusion, including the role of the autonomic nervous system in controlling blood pressure
- 8.2 Discuss cardiac output, heart rate stroke volume and systemic vascular resistance
- 8.3 Describe how the body compensates for decreased perfusion
- 8.4 baroreceptors.
- 8.5 Recognize the causes of shock.
- 8.6 Describe the three states of shock.
- 8.7 Describe the various types of shock including:
- 8.8 Cardiogenic shock
- 8.9 Obstructive shock
- 8.10 Distributive shock
- 8.11 Hypovolemic Shock
- 8.12 Describe the signs and symptoms of shock
- 8.13 Discuss the role of fluid administration in treating a patient in potential shock

Psychomotor Objectives:

- 8.14 Demonstrate how to treat a patient in potential shock
- 8.15 Demonstrate how to complete an EMS patient care report for a patient with bleeding and/or shock

Lesson Content

A. Shock- Review

- 1. Definition
 - a) Perfusion is the passage of blood and oxygen and other essential nutrients to the body's cells
 - b) While delivering these essentials to the body's cells, the circulatory system is also removing waste such as carbon dioxide from the cells
 - c) Shock is a state of hypoperfusion, or inadequate perfusion of blood through body tissues
 - d) Hypoperfusion can lead to death if not corrected
- 2. Anatomy and Physiology Review
 - a) Heart/blood vessels
 - b) Physiology of respiration
 - 1) Gas exchange
 - (a) alveolar level
 - (b) tissue level
 - 2) Circulation
 - (a) pulmonary
 - (b) systemic
 - c) Essential components for normal perfusion
 - 1) Functioning pump/heart
 - (a) stroke volume
 - (b) cardiac output
 - (c) blood pressure

- (d) mean arterial pressure
 - (e) pulse pressure
 - 2) baroreceptors
 - 3) nervous control of heart
 - (a) sympathetic nervous system
 - (b) parasympathetic nervous system
 - 4) Adequate volume
 - (a) formed elements
 - (b) plasma
 - 5) 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 control led by cellular tissue demands
 - (j) sphincter control
- 3. Tissue Hypoperfusion
 - a) Inadequate fluid volume
 - b) Inadequate pump
 - c) Inadequate container size
- 4. Physiologic Response to Shock
 - a) Cellular
 - 1) Fick principle
 - 2) Waste removal
 - 3) Aerobic metabolism/glycolysis
 - 4) Anaerobic metabolism
 - b) Sympathetic nervous system and endocrine implications
- 5. Categories of Shock
 - a) Compensated
 - b) Uncompensated
 - c) Irreversible shock
- 6. Specific Types of Shock
 - a) Hypovolemic
 - 1) Hemorrhage classifications
 - (a) hemostasis
 - (b) vascular phase
 - (c) platelet phase
 - (d) coagulation phase
 - (e) tension lines
 - (f) factors affecting clotting/coagulation
 - 2) Non-Hemorrhage classifications
 - (a) Dehydrations
 - (b) Third spacing

- (c) Insensible loss
 - (d) Large burns
 - 3) Stages of hemorrhage
 - (a) Class I
 - (b) Class II
 - (c) Class II I
 - (d) Class IV
 - b) Distributive
 - 1) Neurogenic
 - 2) Anaphylactic
 - 3) Septic
 - 4) Psychogenic (vasovagal I)
 - c) Cardiogenic
 - 1) Intrinsic causes -- heart muscle damage
 - (a) physiology
 - (b) signs/symptoms
 - (c) assessment
 - (d) management
 - 2) Extrinsic causes
 - (a) cardiac tamponade
 - (b) tension pneumothorax
 - 3) Obstructive – (add concept and information)
7. Complications of Shock
- a) Multiple Organ Dysfunction Syndrome (MODS)
 - 1) Sepsis
 - 2) Death of organs
 - 3) Death of organism
 - b) Acute Respiratory Distress Syndrome (ARDS)
8. Advanced Management
- a) Attempt to control obvious external bleeding
 - b) Provide spinal motion restriction if indicated.
 - c) Comfort, calm, and reassure the patient
 - d) Do not give food or drink
 - e) Provide airway control as indicated
 - f) Breathing
 - 1) Assist ventilation, as needed
 - 2) Oxygen administration (high concentration)
 - g) Circulation
 - 1) Attempt to control obvious external bleeding.
 - 2) Apply pelvic binder or splint long bones as indicated
 - 3) Patient positioning
 - 4) Keep patient warm - attempt to maintain normal body temperature.
 - h) Begin transport at the earliest possible moment. Trauma patients cannot be treated in the field.
 - i) Do not stay on scene to start IVs in a case of hemorrhage or surgical emergency, this can be done en route.
 - j) Fluid resuscitation including permissive hypertenson

- 1) Controllable external hemorrhage
- 2) Uncontrollable external hemorrhage
- 3) Internal hemorrhage
- k) Medications
 - 1) Internal Bleeding- administer as indicated, en route preferred
 - (a) TXA
 - 2) Anaphylaxis:
 - (a) Epi 1mg/1ml
 - (b) Diphenhydramine
- l) Begin transport at the earliest possible moment
- m) Treat any additional injuries that might be present
- n) Passive leg raise to determine need for additional fluid resuscitation, if not contraindicated by mechanism (i.e. head trauma, significant chest trauma)
9. Age-Related Variations
 - a) Pediatrics
 - 1) Common causes of shock
 - (a) Trauma
 - (b) Fluid loss
 - (c) Neurological injury
 - (d) Anaphylaxis
 - (e) Heart disease
 - (f) Infection
 - 2) Presentation
 - (a) Cardiovascular
 - (b) Skin signs
 - (c) Mental status
 - (d) Decreased fluid output
 - (e) Vital signs
 - 3) Anatomic and physiologic implications
 - (a) Unreliable indicators
 - (b) Indicators of shock
 - (1) tachycardia for age
 - (2) weak distal pulses
 - (3) delayed capillary refill time
 - (4) cool mottled extremities
 - (5) altered mental status
 - 4) Management
 - (a) Control bleeding
 - (b) Provide spinal motion restriction
 - (c) Suction, as needed
 - (d) High-concentration oxygen
 - (e) Positioning
 - (f) Maintain body temperature
 - (g) Fluid replacement
 - (h) Transport
 - b) Geriatrics
 - 1) Assessment

- (a) 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 shock
 - (3) respiratory
 - (4) integumentary
 - (5) renal
 - (6) gastrointestinal
- (b) Vital sign variations
 - (1) altered mental status
 - (2) sudden onset
 - (3) other causes
 - (4) hypoxia
- (c) Airway
 - (1) decreased cough reflex
 - (2) cervical arthritis
 - (3) loose dentures
- (d) Breathing
 - (1) higher resting respiratory rate
 - (2) lower tidal volume
 - (3) less elasticity/compliance of chest wall
- (e) Circulation
 - (1) Higher resting heart rate
 - (2) Irregular pulses
- (f) Skin
 - (1) dry, less elastic
 - (2) cold
 - (3) fever, not common
 - (4) hot
- 2) Management
 - (a) Control bleeding
 - (b) Provide spinal motion restriction
 - (c) Suction, as needed
 - (d) Oxygen therapy
 - (e) Positioning
 - (f) Maintain body temperature
 - (g) Fluid Resuscitation
 - (h) Consider TXA if indicated
 - (i) Suspect sepsis or non-hemorrhagic fluid loss in the geriatric patient with undifferentiated shock.
 - (j) Transport

Lesson 9: 12 Lead ECG Course – Only if needed for audience (8 hrs for initial – 4 hrs review)

Objectives

- 9.1 Understand and describe the electrical system of the heart
- 9.2 Recognize normal and abnormal rhythms
- 9.3 Describe the meaning of injury patterns on a 12-lead ECG
- 9.4 List the difference between STEMI and NSTEMI

Psychomotor Objectives:

- 9.5 Demonstrate ECG placement.
- 9.6 Demonstration the proper placement of 12 & 15- lead ECGs.

Lesson Content

- A. Three Lead Review
 - 1. Intrinsic Pacer Sites
 - 2. P Waves
 - 3. PR Interval
 - 4. QRS Complex
 - 5. Q-Waves
 - 6. Normal Ventricular Conduction
 - 7. ST-Segment
 - 8. QT-Segment
 - 9. T Wave
- B. Cardiac Action Potential
- C. 12 Lead Introduction
 - 1. 4 lead Vs 12 Lead
 - 2. When to use a 12-Lead
 - 3. 12-Lead Placement
 - 4. 15-Lead Placement
 - 5. ECG Accuracy
 - 6. Reading a 12-Lead
 - a) What is the 12-Lead looking at
 - b) Interpretation Steps
- D. AHA ACS Classification
 - 1. STEMI
 - 2. UA/NSTEMI
 - 3. Low Risk UA
- E. Identifying STEMI
 - 1. Inferior Wall
 - 2. Septal
 - 3. Lateral
 - 4. Anterior
 - 5. Posterior
- F. Differentiate STEMI from STEMI imposters
 - 1. Common STEMI imposters
 - a) Left ventricular hypertrophy
 - b) Bundle branch Blocks
 - c) Implanted pacemakers
 - d) Pericarditis

Lesson 10: Skills Lab/Competencies (Time frame may vary due to class size and the students need for adequate practice to ensure each student has mastered each skill)

Skills Lab/Competencies

Use universal precautions and body substance isolation procedures during medication administration.

- Demonstrate withdrawal of medication from an ampule, vial (single dose or multi-dose), and assembly of prefilled syringes.
- Demonstrate clean technique during medication administration.
- Demonstrate placement of 12 & 15-leads
- Demonstrate the preparation and administration of medications given by the following routes:
 - Intravenous/Intraosseous push
 - Intravenous/Intraosseous infusion, including the addition of medication and appropriate IV fluid
- Demonstrate IV drip calculations, including volume to be administered, confirming with a double-check system
- Pediatric Skills:
 - Demonstrate intraosseous needle placement and infusion.
- Demonstration how to perform CPR while incorporating the use of a manual defibrillator for Adult, Child and Infant and appropriate medications

Example Schedule

Time/hrs	Description
0.5	Welcome, Intro to Class, Review of Objectives
1	Preparatory EMS Systems
1	Public Health Review
8	Anatomy & Physiology of Body Systems
4	Pathophysiology
4	Principles of Pharmacology
4-8	Skills: Med Administration, including IV, IO, SQ, IM
2	Pain Management
2	Patient Assessment
2	Airway Management Review
2	Respiratory Emergencies
2	Skills: CPAP, Nebulizer, Admin of Epi & Mag Sulphate
2	Cardiovascular Emergencies
2	Skills: CPR Review; Code Station Review; 12 Lead setup Review
2	Neurology
2	Abdominal and Gastrointestinal Disorders
2	Immunologic Disorders
1	Infectious Diseases
2	Endocrine Disorders
2	Mental Illness and Behavioral Disorders
2	Toxicological Emergencies
1	Hematologic Disorders
2	Genitourinary and Gynecologic Disorders
4	Medical Patient Assessment Scenarios
12	ACLS
8-16	Trauma Review: <i>may consider doing an Blended ITLS or PHTLS course here or do overview of All Trauma Systems which would only entail 8 hours of class time (see outline)</i>
2	Pediatric Patient
4	Pediatric Medical, Trauma and Cardiac Arrest Assessment Scenarios
1.5	Geriatrics Patient
2	Patient with Special Challenges
8	Skills Review- NREMT testing station review
94-106	Total estimated hours for the course, depending on the level of training of the EMT 3. If the EMT 3 has some 670 expanded scope training, this may take less time.
Optional:	As needed – depending on the EMT 3
8	12- Lead course
12	PALs Course

Example Equipment List- 10 students

Qty	Description
2	Nasal Airway Kits
2	Oral Airway Kits
2	Adult BVM
2	Child/invant BVM
2	Suction Units
2	O2 cannisters with regulators
2	Adult Airway Management Manikins
2	Pedi Airway Management Manikins (ALS Baby Manikin w IO preferred)
2	CPAP Masks
2	I-Gel or other Supraglottic Airway sets (King LT or Combitube Trainers)
2	Monitor/Defibrillator with Electrodes / Cables
2	Arrhythmia Generators, could be part of an ALS Simulation Manikin
2	ALS Manikins
1	ALS Junior Manikins
1	ALS Baby Manikin
2	IO Systems (ie EZ IO)
2	Blankets
2	Blood pressure cuffs
2	Splint Kit (misc long bone splints)
2	Bandaging Kit (misc gauge, dressings & tape)
	Disposable Supplies
	Gloves
	Alcohol Prep Pads
	Tape and/or Tegederm
	2x2s
	Chux Sheets
	IV Cateters
	Normal Saline
	IV Tubing Sets
	10 cc Preload w NS Syringes
	Blunt Cannula Tips
	Saline Locks/ Ext Sets
	Band aids
	Tourniquets
	3-way stop cocks
	IO needles
	ECG Electrodes
	Face Shields
	Disposable Stethoscopes
	Sharps Container
	Biohazard bags/disposal container
	Med Box with following Medications:
	AEMT Medications
	Adenosine
	Benzodiazepines
	Ativan (Lorazepam)

	Valium)(Diazepam
	Versed (Midazoam)
	Ketamine
	Magnesium Sulfate
	Epinephrine 1mg/ml (1:1,000)
	The Following are EMT-2/-3 Meds <i>(Review Only if needed not part of NAEMT curriculum)</i>
	Narcan (EMT-2)
	*TXA (Tranexamic Acid) (EMT-2)
	*Diphenhydramine (EMT-2)
	Glucagon (EMT-2)
	Nitrous Oxide (EMT-2)
	*Ondasetron (Zofran) (EMT-2)
	*Antiarrhythmic (EMT-3)
	Amiodarone
	Lidocaine
	*Atropine (EMT-3)
	*Fentanyl (EMT-3)
	*Morphine Sulfate (EMT-3)
	*Epinephrine 0.1mg/ml(1:10,000) (EMT-3)
	Med Administrations supplies:
	Various sizes syringes and needles
	ampules
	Preloaded syringes
	Mucosal Atomization Device (MAD)
	Nebulizer
	Filtered needles
	AEMT Testing Equipment list may be found at the NREMT website (nremt.org)