PENNSYLVANIA EMERGENCY HEALTH SERVICES COUNCIL

Your Voice In EMS

RECOMMENDATION FOR CONSIDERATION

Board Meeting Date: April 27, 2016 (by Executive Committee action)

Subject: Additional Education Requirements for PHRNs

VTR#: 0416-01 Committee/Task Force: Air Medical Task Force

☒Recommended Goal ☐Recommended Policy Change ☐Other:

Recommendation:

The Pennsylvania Department of Health should adopt the recommendations contained in the attached document entitled, "Air and Critical Care Ground Transport Ambulance Services: Additional Education Requirements for Prehospital Registered Nurses"

Rationale [Background]:

Pursuant to Pennsylvania EMS regulations, during air or critical care ground transport on a licensed vehicle, at least one of the two EMS crew members providing patient care must have completed additional Department approved education in air or ground critical care transport.

> 28 Pa.C. §§1027.39 (b) and 1027.40 (b)
>
> "The minimum staffing for an [air or critical care] ambulance when responding to a call…is a [pilot or EMSVO] and two (2) EMS providers above the AEMT level with **at least one of the EMS providers** being a paramedic, PHRN, PHPE or PHP who **has successfully completed a [air or critical care] transport education program approved by the Department."**

For some agencies this requirement is satisfied by the use of an expanded scope of practice paramedic [critical care paramedic], however this resource may not be available in every agency. When staffing a licensed air or critical care ground ambulance with a PHRN and ALS paramedic or two (2) PHRNs, the PHRN is required to have completed additional education as referenced above.

This recommendation provides several compliance pathways for the PHRN based on the following objectives:

1. Comply with PA EMS Regulations
2. Identify a compliance pathway that recognizes:
    a. PHRNs with national air or transport specialty certification, i.e. CFRN/CTRN
    b. PHRNs with other national specialty care certification(s), e.g. CEN, CCRN, etc
3. Implement in a manner not burdensome to a provider or agency

Based on these objectives, the following recommended pathways have been identified:

Option 1: Complete a Department approved education course in air medical or ground critical care transport (based on the educational objectives adopted by the Department or as an equivalent option;

Option 2: Possess current certification from the Board of Certification for Emergency Nursing (BCEN) as either a Certified Flight Registered Nurse (CFRN) or Certified Transport Registered Nurse (CTRN) or;

Option 3: Possess current certification in emergency, critical care or other nursing specialty appropriate to the patient population being transported, e.g. neonatal or pediatrics and complete a Department approved bridge course related to air or ground critical care transport. This can be a stand-alone course or integrated into the agency's orientation for new PHRNs.

To facilitate the transition currently practicing PHRNs in a manner that minimizes the impact for providers and EMS agencies in complying with Pa.C. 28 §§ 1027.39(b) & 1027.40(b), it is recommended the Department deem all PHRNs currently credentialed by a licensed air or ground critical care ambulance agency's medical director to be in compliance with respect to the completion of additional Department approved education in air or ground critical care transport.

Medical Review [Concerns]:

The PEHSC Medical Advisory Committee reviewed and concurred with this recommendation on April 13, 2016.

Fiscal Concerns:

The financial impact to providers and/or agencies will vary according to the selected pathway.

Educational Concerns:

The extent to which a PHRN will require additional education will vary according to the selected pathway.

Plan of Implementation:

The Pennsylvania Department of Health should issue an EMS Information Bulletin and RC Memo outlining the recommended compliance pathways and instruct affected EMS agencies to develop and maintain a list of PHRNs in compliance with the regulations through one of the identified pathways.

The PEHSC Committee/Task Force offers consultation to the Department in regard to the content of this Vote to Recommend (VTR) and its attached documents. The PEHSC Committee/Task Force specifically offers staff or member support to participate in Department deliberations regarding this recommendation in an effort to convey committee/task force discussions.

Executive Committee Comments/Concerns: None

Signed:_____ Date_____

President

For PEHSC Use Only – PA Department of Health Response

Accept:____ Table:____ Modify:____ Reject:____

Comments:

Date of Department Response:_____

PENNSYLVANIA EMERGENCY HEALTH SERVICES COUNCIL

Your Voice In EMS

Air & Critical Care Ground Transport Ambulance Services

Additional Educational Requirements For Prehospital Registered Nurses

PEHSC Statewide Air Medical Task Force

3/31/2016

This recommendation (VTR#0416-01) to Pennsylvania Department of Health establishes additional educational requirements for a prehospital registered nurse (PHRN) practicing on a licensed air or critical care ground transport ambulance in accordance with Pennsylvania's EMS regulations.

Table of Contents

Background 3

Objectives 3

Pennsylvania EMS Regulations 3

Proposed Recommendation 4

Transition of Current PHRNs 4

Appendix A: Board of Certification for Emergency Nursing 5

- Certified Registered Flight Nurse 5
- Certified Transport Registered Nurse 8

Appendix B: Approved PA Air and Critical Care Ground Transport Educational Objectives 12

- Preparatory 12
- Pharmacology 13
- Airway Management, Respiration and Artificial Ventilation 13
- Assessment 14
- Medical 14
- Trauma 17
- Special Patient Populations 18
- Psychomotor Skills Review 19

Air and Ground Critical Care Transport Ambulance Services

Additional Educational Requirements: Prehospital Registered Nurses (PHRN)

Background

In addition to the previous work completed to provide an expanded scope of practice to paramedics practicing on licensed air or critical care transport ambulance services, Department approved education programs or an equivalent process must be identified for the PHRN practicing in the same setting. Current regulations require at least one crew member have additional education in critical care/air transport. When a PHRN is staffing a critical care air/ground vehicle without an expanded scope paramedic, by regulation, they are required to have completed additional Department approved education. Typical examples of such a crew configuration includes: a PHRN and ALS Paramedic or two (2) PHRNs.

Objectives

To provide the PEHSC Board of Directors and PA Department of Health, Bureau of EMS with a recommendation that:

1. Complies with the intent of Pennsylvania's EMS regulations.
2. Identifies a pathway for a PHRN possessing national specialty certification in air or ground transport nursing, i.e. CFRN or CTRN.
3. Identifies a pathway for a PHRN possessing a national certification in emergency, critical care or other nursing specialty appropriate to the patient population being transported, e.g. neonatal or pediatrics.
4. Implements the identified pathway(s) in a manner that is not unduly burdensome for the PHRN and/or EMS agency; including exploring the feasibility of "grandfathering" all PHRNs currently practicing on an air/ground critical care transport ambulance.

Pennsylvania EMS Regulations

28 Pa.C. §1027.39 (b) [Related to staffing of a critical care transport ambulance service]

The minimum staffing for a critical care transport crew when responding to a call to provide critical care transport is an EMSVO and *two EMS providers above the AEMT level with at least one of the EMS providers being a paramedic, PHPE, PHRN or a PHP who has successfully completed a critical care transport educational program approved by the Department.* Provided that one of the EMS providers is a paramedic, PHPE, PHRN or a PHP who has successfully completed a critical care transport educational program approved by the Department, another health care provider or providers may substitute for a second EMS provider above the AEMT level to attend to a patient with special medical needs if the EMS agency has submitted to the Department, and received the Department's approval, a plan that provides for substitution to attend to the needs of those patients in accordance with the Department-approved protocol the EMS agency has established for its critical care transport service. Responding crew members may arrive at the scene separately, but the ambulance shall be fully staffed at or above the minimum staffing level before transporting a patient.

28 Pa.C. §1027.40 (b) [Related to Staffing of an Air Ambulance Service]

The minimum staffing for an air ambulance crew when responding to a call to transport a patient by air ambulance is a pilot and *two EMS providers above the AEMT level, with at least one of the EMS providers being a paramedic, PHPE, PHRN or a PHP who has successfully completed an air ambulance transport educational program approved by the Department.*

Provided that one of the EMS providers is a paramedic, PHPE, PHRN or a PHP who has successfully completed an air ambulance transport educational program approved by the Department, another health care provider or providers may substitute for a second EMS provider above the AEMT level to attend to a patient with special medical needs if the EMS agency has submitted to the Department, and received the Department's approval of, a plan that provides for substitution to attend to the needs of those patients in accordance with the Department-approved protocol the EMS agency has established for its air ambulance service. Responding crew members may arrive at the scene separately, but the ambulance shall be fully staffed at or above the minimum staffing level before transporting a patient.

Proposed Recommendation

To satisfy the requirements of 28 Pa. Code §§1027.39(b) and 1027.40(b) respectively, in the absence of a second provider above the AEMT level who has completed a Department approved education in air or critical care ground transport, a PHRN should:

1. Complete a Department approved education course in air medical or ground critical care transport (based on the educational objectives adopted by the Department – see Appendix B) or as an equivalent option;
2. Possess current certification from the Board of Certification for Emergency Nursing (BCEN) as either a Certified Flight Registered Nurse (CFRN) or Certified Transport Registered Nurse (CTRN). See Appendix A for additional information on these certifications, or;
3. Possess current national certification in emergency, critical care or other nursing specialty appropriate to the patient population being transported, e.g. neonatal or pediatrics. Complete a Department approved bridge education containing objectives related to air or ground critical care transport appropriate to the patient population being transported. Completion of the bridge education could be accomplished as a stand-alone course or integrated into the agency's orientation for new PHRNs.

A PHRN who has previously completed one of the aforementioned pathways for ground critical care transport and desires to transition to air ambulance service, must either complete bridge education containing the Department approved flight educational objectives or obtain certification as a CFRN. Completion of the bridge education could be accomplished as a stand-alone course or as part of the agency's orientation for new PHRNs.

Consistent with the established standard, following medical director acceptance of option 2 or 3, any continued requirement for the nurse to maintain a specialty certification will be agency driven.

Transition of Current PHRNs

To minimize the impact for providers and EMS agencies in complying with Pa.C. 28 §§ 1027.39(b) & 1027.40(b), it is recommended the Department deem all current PHRNs currently credentialed by a licensed air or ground critical care ambulance agency's medical director to be in compliance with respect to the completion of additional Department approved education in air or ground critical care transport.

Continuing Education Requirements

Consistent with the provisions previously adopted for the expanded scope of practice paramedic, any requirement for completion of air and/or critical care specific con-ed topics will be at the agency's discretion in consultation with their medical director.

The Department should permit continuing education hours in critical care transport topics to be applied towards the provider's biannual registration [28 Pa. Code §1023.28 (c)(1)].

Appendix A: Board of Certification for Emergency Nursing

Certified Registered Flight Nurse

1991: The National Flight Nurses Association (NFNA), now the Air & Surface Transport Nurses Association (ASTNA), began discussions with BCEN regarding the potential of developing a certification examination for flight nurses. Following extensive study of the comparability of flight nursing and emergency nursing practice, BCEN agreed to develop the Certified Flight Registered Nurse (CFRN) certification.

September 2007: The CFRN certification was approved for accreditation by ABSNC.

April 2013: CFRN was reaccredited by ABSNC.

The Certified Flight Registered Nurse (CFRN) certification measures the attainment of a defined body of nursing knowledge specific to flight nursing. Currently, more than 3,200 nurses hold the CFRN certification. Although there are CFRNs throughout the world, the CFRN exam is based on flight nursing practice in the United States.

You must pass the CFRN exam to attain initial certification. To be eligible to sit for the CFRN exam, you must be a Registered Nurse with a current unrestricted license. A nursing certificate that is equivalent to a registered nurse in the United States is also acceptable. BCEN® recommends 2 years of experience as a flight nurse; however, it is not required.

Throughout BCEN's website you will find resources to help you study and understand the exam material. Upon successful completion of the certification exam, the CFRN credential is valid for 4 years.

If you are a transport nurse who practices exclusively in the flight environment, you can obtain or maintain the CFRN credential. If you are a transport nurse who practices in critical care ground environments, or if you practice in both ground and air environments, then you should choose whichever exam is most appropriate for your practice population or even become certified in both!

Test Content and Development

The CFRN exam consists of 180 items (150 scored and 30 unscored pretest items).

Content in the current CFRN exam is based on test specifications developed from a 2010 role delineation study (RDS) in which more than 800 nurses holding the CFRN or CTRN credential, as well as members of the Air & Surface Transport Association (ASTNA), responded to a job analysis survey detailing tasks critical to flight and transport nursing.

1. General Principles of Practice (22 Items)

A. Transport physiology
    1. Physiologic stressors of transport
    2. Effects of altitude on patients

B. Scene operations
    1. Secure landing zone

C. Communications
    1. Radio operations
    2. Patient handoff
    3.Crew resource management (including AMRM)

D. Safety and survival
    1. ELT
    2. Navigation
    3. Transponder codes
    4. Survival principles (post crash)
    5. Transport vehicle emergencies

2. Patient Care Principles (25 Items)

A. Principles of assessment and patient preparation
    1. History taking, physical assessment, and data gathering principles
    2. Pain management
    3. Preparing the patient for transport (i.e., packaging)
B. Airway management
    1. Airway assessment
    2. Airway management techniques and procedures
    3. Difficulties encountered with airway
    4. Rapid Sequence Intubation (RSI), including pharmacology
C. Mechanical ventilation
    1. Invasive ventilation
    2. Noninvasive ventilation

3. Trauma (38 Items)

A. General principles of management
    1. Mechanism of injury
    2. Hypovolemic shock
    3. Immobilization
    4. Trauma triad (hypothermia, acidosis, coagulopathies)
    5. Scoring
B. Neurologic trauma
    1. Neurogenic shock
    2. Traumatic brain injuries
    3. Spinal cord injuries
    4. Post-traumatic seizures
C. Thoracic trauma
    1. Chest wall injuries
    2. Pulmonary injuries
    3. Cardiac injuries
    4. Great vessel injuries
D. Abdominal trauma
    1. Hollow organ injuries
    2. Solid organ injuries
    3. Diaphragmatic injuries
    4. Retroperitoneal injuries

E. Orthopedic trauma
    1. Vertebral injuries
    2. Pelvic injuries
    3. Compartment syndrome
    4. Amputations
    5. Extremity fractures
    6. Soft-tissue injuries
F. Burn trauma
    1. Chemical burns
    2. Electrical burns
    3. Thermal burns
    4. Radiological burns
    5. Inhalation injuries
G. Maxillofacial and neck trauma
    1. Facial fractures
    2. Ocular trauma
    3. Blunt and penetrating neck trauma

4. Medical Problems (39 Items)

A. Neurologic emergencies
    1. Seizure disorders
    2. Stroke
    3. Neuromuscular disorders
    4. Space-occupying lesions
    5. Encephalopathies (infectious and noninfectious)
B. Cardiovascular emergencies
    1. Obstructive shock (e.g., pericardial tamponade, pulmonary embolism)
    2. Acute coronary syndrome
    3. Congestive heart failure/pulmonary edema
    4. Dysrhythmias
    5. Cardiogenic shock
    6. Aortic diseases
    7. Hypertension
    8. Mechanical/circulatory support (e.g., IABP, VAD)
C. Pulmonary emergencies
    1. COPD, including asthma
    2. Acute lung injury/ARDS
    3. Pulmonary infections (e.g., pneumonia, tuberculosis)
D. Abdominal emergencies
    1. Abdominal compartment syndrome
    2. GI bleed
    3. Conditions of the hollow organs (e.g., obstruction, rupture)
    4. Conditions of the solid organs (e.g., pancreatitis, hepatitis)
E. Electrolyte and acid base imbalances
F. Metabolic and endocrine emergencies
    1. Diabetic emergencies
    2. Neuroendocrine disorders (e.g., diabetes insipidus, SIADH)
    3. Thyroid conditions
    4. Adrenal disorders

G. Hematology and oncology emergencies
    1. Coagulopathies (including platelet disorders)
    2. Anemias
H. Renal emergencies
    1. Acute kidney injury (i.e., acute renal failure)
2. Chronic renal failure
    I. Infectious and communicable diseases
    1. Sepsis and septic shock
    2. Isolation precautions (e.g., MRSA, influenza-like illness)
J. Transport considerations for psychiatric patients

5. Environmental Emergencies and Toxicology (8 Items)

A. Environmental emergencies
    1. Anaphylaxis
    2. Cold related (e.g., hypothermia, frostbite)
    3. Heat related (e.g., heatstroke, heat exhaustion)
    4. Submersion injuries (i.e., diving injuries, drowning, near drowning)
B. Toxicology

6. Obstetrical Patients (8 items)

    A. Complications of pregnancy (e.g., ectopic, gestational hypertension, preterm labor)
    B. Delivery and post-partum care
    C. Neonatal resuscitation
    D. Trauma

7. Patient Care Issues and Management (10 items)

A. Patient care issues
    1. Evidence-based practice and research
    2. Legal issues (e.g., HIPAA, EMTALA, malpractice, consent, scope of practice)
    3. Abuse and neglect (e.g., pediatric, geriatric, intimate partner)
    4. Ethical issues
    5. Psychosocial issues in transport (including families)
B. Management
    1. Quality management
    2. Outreach and community education
    3. Stress management (e.g., self-care, post-traumatic critical incident)

Certified Transport Registered Nurse

2004: BCEN & ASTNA jointly funded the Role Delineation Study (RDS), involving an extensive study of flight and ground transport nursing.

December 2005: By the end of 2005, BCEN had completed the RDS and created the exam content outline, questions, procedures, passing requirements and a handbook.

March 2006: The CTRN exam was launched.

The Certified Transport Registered Nurse (CTRN) certification measures the attainment of a defined body of nursing knowledge specific to critical care ground transport nursing. Currently, more than 195 nurses hold the CTRN certification. The CTRN exam is based on ground transport nursing practice in the United States.

You must pass the CTRN exam to attain initial certification. To be eligible to sit for the CFRN exam, you must be a Registered Nurse with a current unrestricted license. A nursing certificate that is equivalent to a registered nurse in the United States is also acceptable. BCEN® recommends 2 years' experience as a ground transport nurse; however, it is not required.

Throughout BCEN's website you'll find resources to help you study and understand the exam material. Upon successful completion of the certification exam, the CTRN credential is valid for 4 years.

Test Content & Development

The CTRN exam consists of 155 items (130 scored and 25 unscored pretest items).

Content in the current CTRN exam is based on test specifications developed from a 2010 role delineation study (RDS) in which more than 800 nurses holding the CFRN or CTRN credential, as well as members of the Air & Surface Transport Association (ASTNA), responded to a job analysis survey detailing tasks critical to flight and transport nursing.

1. General Principles of Practice (15 items)

A. Transport physiology
    1. Physiologic stressors of transport
B. Communications
    1. Radio operations
    2. Patient handoff
    3. Crew resource management (including AMRM)
C. Safety and survival
    1. Transport vehicle emergencies

2. Patient Care Principles (23 items)

A. Principles of assessment and patient preparation
    1. History taking, physical assessment, and data gathering principles
    2. Pain management
    3. Preparing the patient for transport (i.e., packaging)
B. Airway management
    1. Airway assessment
    2. Airway management techniques and procedures
    3. Difficulties encountered with airway
    4. Rapid Sequence Intubation (RSI), including pharmacology
C. Mechanical ventilation
    1. Invasive ventilation
    2. Noninvasive ventilation

3. Trauma (30 items)

A. General principles of management
    1. Mechanism of injury
    2. Hypovolemic shock
    3. Immobilization
    4. Trauma triad (hypothermia, acidosis, coagulopathies)
B. Neurologic trauma
    1. Neurogenic shock
    2. Traumatic brain injuries
    3. Spinal cord injuries
    4. Post-traumatic seizures

C. Thoracic trauma
    1. Chest wall injuries
    2. Pulmonary injuries
    3. Cardiac injuries
    4. Great vessel injuries
D. Abdominal trauma
    1. Hollow organ injuries
    2. Solid organ injuries
    3. Diaphragmatic injuries
    4. Retroperitoneal injuries
E. Orthopedic trauma
    1. Vertebral injuries
    2. Pelvic injuries
    3. Compartment syndrome
    4. Amputations
    5. Extremity fractures
    6. Soft-tissue injuries
F. Burn trauma
    1. Chemical burns
    2. Electrical burns
    3. Thermal burns
    4. Inhalation injuries
G. Maxillofacial and neck trauma
    1. Facial fractures
    2. Ocular trauma
    3. Blunt and penetrating neck trauma

4. Medical Problems (38 Items)

A. Neurologic emergencies
    1. Seizure disorders
    2. Stroke
    3. Neuromuscular disorders
    4. Space-occupying lesions
    5. Encephalopathies (infectious and non-infectious)
B. Cardiovascular emergencies
    1. Obstructive shock (e.g., pericardial tamponade, pulmonary embolism)
    2. Acute coronary syndrome
    3. Congestive heart failure/pulmonary edema
    4. Dysrhythmias
    5. Cardiogenic shock
    6. Aortic diseases
    7. Hypertension
    8. Mechanical/circulatory support (e.g., IABP, VAD)

C. Pulmonary emergencies
    1. COPD, including asthma
    2. Acute lung injury/ARDS
    3. Pulmonary infections (e.g., pneumonia, tuberculosis)
D. Abdominal emergencies
    1. Abdominal compartment syndrome
    2. GI bleed
    3. Conditions of the hollow organs (e.g., obstruction, rupture)
    4. Conditions of the solid organs (e.g., pancreatitis, hepatitis)
E. Electrolyte and acid base imbalances
F. Metabolic and endocrine emergencies
    1. Diabetic emergencies
    2. Neuroendocrine disorders (e.g., diabetes insipidus, SIADH)
    3. Thyroid conditions
    4. Adrenal disorders
G. Hematology and oncology emergencies
    1. Coagulopathies (including platelet disorders)
    2. Anemias
H. Renal emergencies
    1. Acute kidney injury (i.e., acute renal failure)
    2. Chronic renal failure
I. Infectious and communicable diseases
    1. Sepsis and septic shock
    2. Isolation precautions (e.g., MRSA, influenza-like illness)
    3. Transport considerations for psychiatric patients

5. Environmental Emergencies and Toxicology (7 Items)

A. Environmental emergencies
    1. Anaphylaxis
    2. Cold related (e.g., hypothermia, frostbite)
    3. Heat related (e.g., heatstroke, heat exhaustion)
    4. Submersion injuries (i.e., diving injuries, drowning, near drowning)
B. Toxicology

6. Obstetrical Patients (7 Items)

A. Complications of pregnancy (e.g., ectopic, gestational hypertension, preterm labor)
B. Delivery and post-partum care
C. Neonatal resuscitation
D. Trauma

7. Patient Care Issues and Management (10 Items)

A. Patient care issues
    1. Evidence-based practice and research
    2. Legal issues e.g., HIPAA, EMTALA, malpractice, consent, scope of practice)
    3. Abuse and neglect (e.g., pediatric, geriatric, intimate partner)
    4. Ethical issues
    5. Psychosocial issues in transport (including families)
B. Management
    1. Quality management
    2. Outreach and community education
    3. Stress management (e.g., self-care, post-traumatic critical incident)

Appendix B: Approved PA Air and Critical Care Ground Transport Educational Objectives

Preparatory

A. EMS Systems
    1. History of critical care transport
    2. Modes of critical care transport
    3. Crew configurations
    4. Prehospital v. Interfacility transports
    5. Ethical considerations
B. Patient Safety During Transport
    1. Provider knowledge/experience
    2. Available resources
C. Medical Director Support
    1. Declination of transport for safety reasons
    2. Education of facilities and physicians on safe transport practices
D. Flight Operations and Physiology ***(Air Only)***
    1. Rotary-wing and fixed-wing aircraft
    2. Crash and mishap avoidance
    3. Safety considerations in air-medical operations
E. Atmosphere and Gas Laws ***(Air Only)***
    1. Temperature
    2. Pressure
    3. Volume
    4. Relative Mass
    5. Boyle's Law
    6. Dalton's Law
    7. Charles' Law
    8. Gay-Lussac's Law
    9. Henry's Law
    10. Graham's Law of Gaseous Diffusion
F. Stresses of Transport ***(Air Only)***
    1. Hypoxia (review all types)
    2. Barometric Pressure Changes
    3. Thermal Changes
    4. Decreased Humidity
    5. Noise
    6. Vibration
    7. Fatigue
    8. Gravitational Force
    9. Spatial disorientation
    10. Flicker vertigo
    11. Fuel vapors
G. Pressurized vs. Non-Pressurized Aircraft ***(Air Only)***
    1. Altitude related disorders
    2. Flight tolerance of the ill and injured
H. Documentation
    1. Documenting the critical care assessment
    2. Supplemental documentation for reimbursement and operations

I. EMS System Communications
    1. Online Medical Direction
    2. Flight Following ***(Air Only)***
    3. Communicating with ground providers ***(Air Only)***

Pharmacology

A. Review of Medications Commonly Used During Transport
    1. Analgesics
    2. Sedatives
    3. Paralytics
    4. Induction agents
    5. Antiarrhythmics
    6. Antianginals
    7. Antihypertensives
    8. Vasopressors
    9. Thrombolytics
    10. Bronchodilators
    11. Antibiotics
    12. Corticosteriods
    13. Antiemetics
    14. Diuretics
    15. Insulin
    16. Anticonvulsants
    17. Anticoagulants
    18. Anti-Platlet agents
    19. Tocolytics
    20. Prostaglandins
    21. Parenteral nutrition
B. Pharmacodynamics
C. Medication Administration
    1. Use of intravenous infusion pumps
    2. Infusion considerations for central vs. peripheral vein

Airway Management, Respiration and Artificial Ventilation

A. Drug Facilitated Intubation
B. Tracheostomy Management
C. Airway Control in Special Patient Populations
    1. Neonates/infants
    2. Pediatrics
    3. Bariatric patients
D. Assessment and Management of the Difficult Airway
E. Arterial Blood Gas Interpretation and Monitoring
F. Mechanical Ventilation
    1. Principles of ventilation
    2. Patient assessment for mechanical ventilation
    3. Ventilator modes and parameters
    4. Troubleshooting

Assessment

A. Landing Zone Safety Assessment ***(Air Only)***
    5. Location
    6. Size
    7. Elevated obstructions
    8. Ground-level hazards

B. History Taking
    9. Differentiate between essential information in the prehospital and interfacility transport setting
    10. Effectively communicating with other healthcare professionals involved in the transfer of care process

C. Laboratory Data
    11. Understanding of critical laboratory values
    12. Using portable blood analysis devices

D. Medical Imaging
    13. Radiographs
    14. CT scans
    15. MRI
    16. Ultrasound

G. Invasive Pressure Monitoring
    1. Invasive vs. non-invasive pressure monitoring in prehospital environment
    2. Arterial pressure monitoring
    3. Venous pressure monitoring
        a. Triple lumen catheters
        b. SCVO2 catheters
        c. Pulmonary artery catheters
    4. Invasive monitoring catheter/line management
    5. Calibration and use of pressure transducers
    6. Interpreting pressure measurements

Medical

A. Neurology
    1. Review of anatomy, physiology, pathophysiology, neurological focused assessment and management
    2. Use of NIH stroke assessment tool
    3. Thrombolytics
    4. Therapeutic hypothermia
    5. Intra-cranial pressure monitoring

B. Abdominal/GI disorders
    1. Review of anatomy, physiology, pathophysiology, GI focused assessment and management
    2. Management of enteral feeding devices
    3. Management of drains
    4. Management of vacuum closure devices
    5. Altitude considerations ***(Air Only)***

C. Infectious Diseases
    1. Review of anatomy, physiology, pathophysiology, focused assessment, PPE/universal precautions and management
    2. Use of antibiotics, antiviral and antifungal medications
    3. Infections in special patient populations
    4. The immuno-suppressed patient
    5. Post exposure prophylaxis for the healthcare provider
D. Endocrinology
    1. Review of anatomy, physiology, pathophysiology, focused assessment and management
    2. Types of insulin and administration technique
    3. Correctable endocrine conditions, e.g. hypoglycemia, etc.
    4. Adrenal insufficiency
E. Psychiatric
    1. Ground and air transport safety ***(Air Only)*** considerations
    2. Use of physical and/or pharmacological restraint
F. Cardiology
    1. Review of anatomy, physiology, pathophysiology, cardiovascular focused assessment and management. Reinforce the importance of prehospital STEMI recognition through the use of 12-lead EKGs and the use of therapeutic hypothermia in post-resuscitation management.
    2. Electrophysiology devices
        a. Pacemakers, including epicardial and transvenous
    3. Cardiac assist devices
        a. LVAD and BiVAD
        b. Intra-aortic balloon pump (IABP)
        c. Extracorporeal membrane oxygenation (ECMO)
    4. Management of mediastinal chest tube
G. Toxicology
    1. Review of anatomy, physiology, pathophysiology, toxicology assessment and management. Reinforce the importance of safety assessment, PPE and decontamination procedures prior to transport
    2. Intentional vs. unintentional poisoning
    3. General management principles
        a. Initial management
        b. History taking and assessment
        c. Symptoms of poisoning or toxic exposure
        d. Physical exam
        e. Laboratory studies
    4. Removal, elimination or disruption of toxins
    5. Supportive and emotional care
    6. Safety issues during transport
    7. Pharmacologic properties of drugs

8. Toxicity and treatment of poisoning by specific drugs
    a. Acetylsalicylic Acid
    b. Acetaminophen
    c. Antidepressants, e.g. Tricyclics
    d. Benzodiazepines
    e. Cardiac drugs, i.e. beta blockers, calcium channel blockers, digitalis, etc.
    f. Cocaine and other illicit drugs
    g. Cyanide
    h. Hallucinogens
    i. Alcohol
    j. Ethylene Glycol
    k. Carbon Monoxide
9. Snakebite
    a. Recognition of venomous snakes
    b. Initial management
    c. Advanced treatment during transport, including anti-venom

H. Respiratory
1. Review of anatomy, physiology, pathophysiology, respiratory focused assessment and management
2. CPAP and BiPAP

I. Hematology
1. Administration of blood and blood products
    a. Indications
    b. Whole blood, blood components, and substitutes
    c. Typing and compatibility
    d. Pre-transfusion, concurrent, and post-transfusion assessment
    e. Administration techniques
    f. Management of transfusion complications
    g. Documentation

J. Genitourinary/Renal
1. Review anatomy, physiology, pathophysiology, focused assessment, and management
2. Insertion and management of a foley catheter
3. Management of
    a. Renal replacement therapy
    b. Nephrostomy tubes
    c. Supra-pubic catheters

K. Gynecology
1. Review anatomy, physiology, pathophysiology, focused assessment, and management

L. Non-Traumatic Musculoskeletal Pain
1. Review anatomy, physiology, pathophysiology, focused assessment, and management

M. Eyes, Ears, Nose and Throat
1. Review anatomy, physiology, pathophysiology, focused assessment, and management

N. Shock and Resuscitation
1. Review types of shock, assessment parameters and management principles

Trauma

A. Bleeding
   1. Review the pathophysiology and management of bleeding, including hemostatic agents and commercial tourniquets
   2. DIC/coagulopathy
   3. Assessment and laboratory studies associated with the anti-coagulated patient
   4. Management of the anti-coagulated patient
      a. Fresh frozen plasma
      b. Vitamin K
      c. Clotting factors

B. Chest Trauma
   1. Review pathophysiology, assessment and management of chest trauma
   2. Management of chest tubes

C. Abdominal and Genitourinary Trauma
   1. Review pathophysiology, assessment and management of abdominal and genitourinary trauma
   2. Understanding ultrasound images as part of the F.A.S.T exam

D. Orthopedic Trauma
   1. Review pathophysiology, assessment and management of orthopedic trauma
   2. Use of commercial pelvic stabilization devices
   3. Manual reduction of extremity fracture or dislocation with vascular compromise

E. Soft Tissue Trauma
   1. Review pathophysiology, assessment and management of soft tissue trauma
   2. Recognition and management of crush syndrome
   3. Recognition and management of compartment syndrome
   4. Administration of tetanus immunization

F. Head, Facial, Neck and Spine Trauma
   1. Review pathophysiology, assessment and management of head, facial, neck and spine trauma
   2. Advanced management of spinal cord injuries

G. Nervous System Trauma
   1. Review pathophysiology, assessment and management of nervous system trauma

H. Special Considerations in Trauma
   2. Review pathophysiology, assessment and management of special patient population trauma
      a. Pregnant patient
      b. Pediatric patient
      c. Geriatric patient
      d. Cognitively impaired patient

I. Environmental Emergencies
   1. Review pathophysiology, assessment and management of environmental emergencies
   2. Management of suspension trauma

J. Multi-System Trauma
   1. Review pathophysiology, assessment and management of multi-system trauma
   2. Management of blast injuries

Special Patient Populations

A. Obstetrics
   1. Fetal assessment
   2. Fetal monitoring data
   3. Ultrasound images related to ectopic pregnancy
   4. Fetal heart rate abnormalities
      a. Variability
      b. Periodic Changes
      c. Acceleration (Variable, Early, Late, Sinusodal)
      d. Bradycardia/Tachycardia
      e. Contributing factors to fetal distress
   5. Pre-eclampsia and eclampsia
   6. Administration of tocolytics
   7. Complications of pregnancy
      a. Amniotic fluid embolism
      b. Breech presentation
      c. Post-partum hemorrhage
      d. Uterine inversion
      e. Precipitous delivery
      f. Retained placenta
      g. Shoulder dystocia
      h. Umbilical prolapse
      i. Gestational diabetes
      j. Placenta abruption
      k. Placenta privia
      l. Disseminated intravascular coagulation (DIC)
      m. Multiple gestation
      n. HELLP syndrome
      o. Pre-term labor

B. Neo-Natal Care
   1. Respiratory disorders, e.g. surfactant deficiency
   2. Cardiac structural and flow abnormalities
      a. Patent ductus arteriosm (PDA)
      b. Patent foramen ovale (PFO)
      c. Ventricular septal defect (VSD)
      d. Tetrology of fallots
      e. Transposition of the great vessels
   3. Sepsis
   4. Thermoregulation using an isolette
   5. Critical neonate laboratory values

C. Pediatrics
   1. Review age-related assessment findings, anatomic and physiologic variations, developmental stage related assessment and treatment modifications of the pediatric-specific major or common diseases and/or emergencies

D. Geriatrics
   1. Review normal and abnormal changes associated with aging, pharmacokinetic changes, psychosocial and economic aspects of aging, polypharmacy, and age-related assessment and treatment modifications for the major or common geriatric diseases and/or emergencies

E. Patients with Special Challenges
    1. Air medical transport of the bariatric patient ***(Air Only)***
        a. Aircraft weigh and balance issues ***(Air Only)***
    2. Patients requiring specialty equipment and staffing support during interfacility transport
    3. Pre-transport briefing of non-EMS caregivers

Psychomotor Skills Review

A. Airway and Breathing
    1. Drug facilitated airway control, i.e. RSI
    2. Operation of mechanical transport ventilators
    3. Tracheostomy management
B. Assessment and Monitoring
    1. Maintenance and access to invasive pressure monitoring devices and interpretation of monitoring parameter information
    2. Interpretation of critical laboratory values
    3. Arterial blood gas interpretation
    4. Interpretation of medical imaging information
    5. Interpretation of fetal monitoring data
    6. Operation of portable blood analysis equipment
F. Pharmacology
    1. Expanded administration of enteral and parenteral prescription medications as ordered by a medical command physician or by approved protocol
    2. Infusion of blood, blood products or blood substitutes
    3. Initiation and/or maintenance of thrombolytics
G. Medical and Cardiac Care
    1. IABP monitoring
    2. ECMO monitoring
    3. VAD monitoring
    4. Pacemakers
    5. Feeding tube management
    6. Foley catheter insertion/management
H. Trauma Care
    1. Chest tube management
    2. Drain management
    3. ICP monitoring
I. Special Patient Populations
    1. Isolette operations
    2. Fetal monitoring